# SUPPLEMENT.

# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

**FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.**

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## Original Correspondence.

### IRONWORKS AND COLLIERIES IN YORKSHIRE.

*THE SILKSTONE FALL COLLIERY.*

A SINGULAR "ACCIDENTAL" BED OF COAL.

Of the peculiarities to be found in connection with the various seams of coal worked in the mining districts of Yorkshire none are more singular than the "Accidental" bed met with in the process of sinking, and since worked, at the Silkstone Fall Colliery, which has recently been transferred to a limited company. The colliery is situate between Barnsley and Silkstone, by the side of the Manchester, Sheffield, and Lincolnshire Railway, being in the centre of a highly mineralised district, where the Silkstone coal is being extensively worked. There are three shafts, two being downcasts, and an upcast. The downcasts are each 12 ft. in diameter, and the upcast 10 ft. The first seam reached is the Parkgate, distant about 20 yards from the surface. It is divided into two beds by a parting of 8 feet of fire-clay. The top bed, 3 feet thick, is a very good house coal, whilst the bottom bed, also about 3 ft. thick, but having a parting of 3 in. of dirt, is a capital steam as well as an excellent coking coal. The Parkgate seam is worked in different parts of South Yorkshire, and is the principal index to the Silkstone Main coal, the distance between the two averaging about 100 yards. The next seam is the Thorncliffe, about 46 yards from the surface, the upper being separated from the lower portion by a parting of very fine fire-clay, 2 ft. in thickness. Of the coal the top part is in good request for steam purposes, and is extensively used at the works of Cammell and Co. (Limited), Sheffield, the well-known makers of heavy armour plates and Bessemer steel; whilst the bottom, 2 ft. 6 in. thick, is well adapted for household purposes, and as such is in brisk request for the London market. After passing through the Thorncliffe we come to the "Accidental," or the "Swilly," bed, the thickness being 5 ft. 6 in., lying at a depth of 70 yards from the surface, but of which we shall give the details at length hereafter.

About 15 yards below the "Accidental" bed, the Silkstone Four-feet coal is met with, and of which there is a large unworked area, calculated to yield nearly 400,000 tons. This seam is now being rotten to the extent of from 200 to 300 tons a-day, and must now be yielding a very large profit. The smudge is made into coke suitable for iron smelting, there being a demand for the Sheffield district alone for a great deal more than is being produced, and at very remunerative prices. At a distance of about 35 yards from the Four-feet seam, and 125 yards from the surface, is the Silkstone Main bed, well known for its superior quality as a gas and house coal. It has been partially worked at Silkstone Fall, but it is proposed to re-open the workings to the seam, and get what is left.

The mode of working in the principal bed is the long wall, now pretty generally adopted throughout South Yorkshire, the bord-gates being from 45 yards to 55 yards in extent. In the "Swilly," or "Accidental," bed there is an engine for drawing the coal from the dips along the plane, the steam being supplied from a boiler placed near to the ventilating furnace. From the same boiler the steam is also conveyed a distance of 1154 yards to another engine, which pumps the water from the bottom pit into the sump. In the Four-feet bed there is a self-acting jinny, by means of which the empty corves are drawn to the working places as the full ones are let down to the bottom to be drawn to the surface, both passing over self-acting points, which close as soon as the corves have gone over.

The ventilation is of the ordinary furnace method, the grate being about 7 ft. wide. The same furnace is utilised for ventilating the lower seam, an iron plate being rather ingeniously arranged over the upcast, so as to prevent the cross-cutting of the air.

The surface works are well laid out, the line of railway running quite close to the pit banks being of great advantage, as well as effecting a saving in time in dispatching the wagons. At the No. 1 pit there are a pair of horizontal engines, by Gimson, of Stalybridge, working a round wire-rope on a 10-ft. drum. The same engine also pumps the water out of the pit during the night, when it is not otherwise required. In the No. 2 Pit, where the Parkgate and the Thorncliffe seams of coal are raised, there is a horizontal engine, working a wire-rope on a 7-ft. diameter drum. There are four tubular boilers, by Garforth, of Dukinfield, for supplying the surface engines, the water being supplied by the Barnsley Corporation, being gathered from the hilly ground in a district not far distant from the gathering ground which supplies Manchester and Salford, and is so pure and soft that there is little or no incrustation.

At the present time the company have quite close to their pits 26 coke ovens, the produce at the present time realising very large profits. Seeing, however, that there is not only a great but an increasing demand for coke, it is proposed to erect as many more, all the coal raised, large as well as small, being well adapted for converting into coke, whilst the proximity of the colliery to the steel-works at Penistone, as well as to those in Sheffield and its neighbourhood, place it in a good position for doing an extensive and lucrative business in the most profitable branch of the coal trade.

As yet the ironstone lying between the Silkstone Four-feet and the Silkstone Main seams has not been worked in the immediate district in which the colliery is situate; but as it is only some 7 or 8 yards below the former, there is every reason to believe that it will shortly be wrought. At the Strafford Main Colliery two seams of the ironstone were passed through, the white ironstone mine being 5 ft. thick, and the one just below it, the black shale ironstone mine, 6 ft. thick, the latter being rather more than 14 yards from the Silkstone Main coal. We believe that it is intended to get one of the seams at least, there being now a scarcity of iron ore, prices of which are rapidly increasing, consequent on the demand.

The company are now engaged in erecting the necessary buildings for carrying out on an extensive scale the making of coal and other wagons, and a shed is now in course of construction, 104 ft. long and 52 ft. wide, so that over a dozen wagons will be turned out weekly. Already orders are in hand that will occupy at least three months in completing, so that an excellent start has been made. There are saw-mills for cutting up the timber for the wagons all ready, with blacksmiths' and carpenters' shops. There is also an engine for working the saws and the fans for blowing the blacksmiths' fires.

Mr. E. Booth is the managing director of the colliery and works, Mr. G. Jackson being the underground viewer.

The "Accidental," or "Swilly," bed of coal, lying in a sort of trough, has a roof of black shale, containing ironstone nodules, and is made up of several different qualities of coal, having in all probability been formed at different periods, their characteristics and quality being widely different. The bed commences apparently on the New Hall Farm, on the estate of Mr. R. C. Clarke, of the Old Silkstone Collieries, and in a south-easterly direction to New Sovereign Colliery, where it will be found to a considerable extent in the direction of the Worsbro' Dale. In its course from the Silkstone Fall Colliery it crosses the great throw, or fault, of 69 yards to the south-west, extending from the village of Silkstone, under Champney Hill, and is found to be of increased thickness beyond the throw, in some places being nearly 7 feet thick. The "Swilly," or basin, averages about 150 yards in width, measuring from the point on each side where the coal has thinned down to 24 in. The centre, or thickest, portion of the seam follows a line bearing about 40° south-east, with an average falling gradient of about 1 in 40 in the same direction, and from that line the floor rises on the south-west side, with a gradient of about 1 in 3, and on the north side with a gradient of 1 in 13. The coal being followed on the north-east side, for the purpose of proving the thickness of the seam in its regular position, it was found to be about 11 inches, the cannel and hard coal having thinned out, the former at 30 yards and the hard at 60 yards from the centre. The position of the bed was most singular, and the floor of the mine very irregular, having in some places a falling gradient to the south-east of 1 in 5, and in others lying nearly level, or inclining slightly in a contrary direction. Looking, therefore, at the position of the "Swilly," or trough of coal, and its peculiar situation, the evidence is strongly in favour of the presumption that the site of the formation of the bed of coal was at one period the course of some lake or river, most probably the former. Such, we may state, is the opinion of Mr. Booth, as well as of other engineers whose attention has been called to the elucidation of a peculiarity which we are not aware has before been made known, or appeared in connection with colliery operations in this country. Whether the hypothesis we have noted is the correct one, of course, is open to doubt; it has, however, the merit of being the only one that has yet been given. The seam of coal so found has been, at least, highly profitable to the proprietors, and it is to be hoped that more accidents of the same character are yet in store for them.

## SALES OF COPPER ORES.

### COPPER ORES SOLD AT THE CORNWALL TICKETINGS FOR THE QUARTER ENDING JUNE 30, 1872.

| Mine. | Tons. | Amount. |
|---|---|---|
| Devon Great Consols | 4208 | £16,258 10 6 |
| South Caradon | 1348 | 12,352 12 6 |
| West Tolgus | 1044 | 7,244 1 0 |
| West Seton | 660 | 4,990 11 6 |
| Glasgow Caradon | 637 | 4,717 4 0 |
| Marke Valley | 1088 | 4,398 17 6 |
| Hingston Down | 548 | 3,643 18 6 |
| East Caradon | 506 | 2,993 6 6 |
| Phœnix Mines | 510 | 2,971 1 0 |
| East Pool | 617 | 2,765 14 6 |
| Crenver and Abraham | 508 | 2,476 9 6 |
| Brookwood | 329 | 2,380 13 6 |
| Gawton | 633 | 2,352 5 6 |
| South Carn Brea | 152 | 2,190 14 0 |
| South Crofty | 525 | 2,160 18 6 |
| Wheal Seton! | 340 | 1,748 5 6 |
| Prince of Wales | 233 | 1,534 17 6 |
| Carn Brea | 218 | 1,458 9 0 |
| Bedford United | 391 | 1,458 4 0 |
| Wheal Friendship | 192 | 1,264 12 0 |
| Wheal Basset | 215 | 1,182 2 0 |
| Wheal Russell | 335 | 1,099 3 0 |
| Craddock Moor | 145 | 953 3 6 |
| Gunnislake | 216 | 945 6 6 |
| New Pembroke | 93 | 799 8 0 |
| West Maria and Fortescue | 240 | 793 5 0 |
| West Caradon | 143 | 614 9 0 |
| West Wheal Basset | 82 | 463 7 0 |
| North Crofty | 65 | 450 2 6 |
| Wheal Jewell | 78 | 347 6 6 |
| South Frances | 44 | 304 12 6 |
| Wheal Crebor | 84 | 285 18 0 |
| Carn Camborne | 40 | 252 15 0 |
| East Grenville | 64 | 249 18 6 |
| Wheal Buller | 20 | 243 10 0 |
| Wheal Jewell | 38 | 134 2 6 |
| Belstone | 21 | 229 15 6 |
| East Seton | 45 | 220 10 0 |
| Tincroft | 42 | 191 2 0 |
| Florence and Tonkin | 50 | 187 10 0 |
| Pennance | 21 | 160 13 0 |
| Poldice | 29 | 125 8 6 |
| Emily Henrietta | 23 | 114 13 6 |
| Clifford | 40 | 110 0 0 |
| Kelly Bray | 44 | 97 0 0 |
| White and Co's Ores | 167 | 95 3 0 |
| Wheal Grenville | 14 | 90 13 0 |
| Elliott's Ore | 40 | 82 14 0 |
| Matthews's Ore | 25 | 65 12 6 |
| Wheal Prosper | 15 | 56 5 0 |
| Virtuous Lady | 17 | 44 12 6 |
| Buglehole's Ore | 7 | 31 13 6 |
| St. Aubyn United | 2 | 23 18 0 |
| Godden's Ore | 7 | 24 13 6 |
| South Tolcarne | 6 | 21 6 0 |
| West Damsel | 4 | 20 0 0 |

### COMPANIES BY WHOM THE ORES WERE PURCHASED.

| Purchaser. | Tons. | Amount. |
|---|---|---|
| Vivian and Sons | 2473 | £10,033 2 11 |
| P. Grenfell and Sons | 1609 | 12,402 0 4 |
| Sims, Willyams, and Co. | 2195 | 13,677 17 2 |
| Williams, Foster, and Co. | 3590 | 24,013 2 10 |
| Mason and Elkington | 2269 | 10,621 3 8 |
| Copper Miners' Company | 1863 | 6,239 1 8 |
| Charles Lambert | 1330 | 6,966 5 9 |
| Sweetland, Tuttle, and Co. | 975 | 5,520 14 11 |
| Bede Metal Company | 902 | 2,899 9 3 |
| Total | 17,206 | £92,372 18 6 |

### COPPER ORES SOLD AT SWANSEA TICKETINGS FOR THE QUARTER ENDING JUNE 30, 1872

| Mine. BRITISH. | Tons. | Amount. |
|---|---|---|
| Knockmahon | 1843 | £14,558 1 6 |
| Berehaven | 1439 | 12,754 15 0 |
| Fursdon | 277 | 1,163 11 0 |
| Connorree | 306 | 662 8 0 |
| Cappagh | 48 | 650 9 6 |
| Tigrony | 18 | 588 12 6 |
| Total | 3931 | £30,377 17 0 |

| COLONIAL. | | |
|---|---|---|
| Cape | 1858 | £63,701 14 6 |
| Paramatta | 690 | 9,835 18 0 |
| Yelta | 289 | 3,264 19 0 |
| Australian | 34 | 1,085 2 0 |
| Concordia | 8 | 177 2 0 |
| Total | 2879 | £78,064 15 6 |
| FOREIGN. | | |
| Del Soto | 89 | £ 1,221 10 6 |
| Telhadella | 36 | 390 3 0 |
| Total | 125 | £ 1,611 13 6 |
| RECAPITULATION. | | |
| British | 3931 | £30,377 17 0 |
| Colonial | 2879 | 78,064 15 6 |
| Foreign | 125 | 1,611 13 6 |
| Sundries | 999 | 6,629 0 6 |
| Total | 7934 | £116,683 6 6 |

### COMPANIES BY WHOM THE ORES WERE PURCHASED.

| Purchasers. | Tons. | Amount. |
|---|---|---|
| Copper Miners' Company | 735 | £ 7,096 9 0 |
| P. Grenfell and Sons | 506 | 8,345 0 11 |
| Sims, Willyams, and Co. | 913 | 10,539 14 10 |
| Vivian and Sons | 1732 | 18,485 19 0 |
| Williams, Foster, and Co. | 2097 | 39,012 6 11 |
| Mason and Elkington | 315 | 7,762 8 0 |
| Charles Lambert | 761 | 8,583 14 6 |
| Sweetland, Tuttle, and Co. | 418 | 8,738 10 6 |
| Ravenhead Copper Company | 57 | 2,030 12 6 |
| Landore Copper Company | 400 | 6,088 10 4 |
| Total | 7934 | £116,683 6 6 |

## COPPER AND COAL IN CHILI.

Sir,—As there seems to be conflicting opinions as to the price of copper likely to rule in the immediate future, and most of the copper mining shares are greatly depressed through the fear of low prices, I think it may be interesting to some of your readers to hear the views of an impartial observer in Chili. I will, therefore, give the following extract from a letter, dated May 17, and received by me by last mail:—"As regards the price of copper, I think it will rise even higher than yourselves in England have any idea of. Mining and smelting on this side is at this moment seriously impeded in some respects; indeed, it bids fair to come to a dead lock, simply because there is an excessive scarcity of native labour (peons), so far insufficient to raise the requisite coal and ore that all establishments using coal are stopping, or threatened with stoppage. It has so happened that the bulk of the labourers has gone off to Caracoles, and to construct railways in Peru; and simultaneously with the advance of price in copper, an extra number of steamers have appeared on the coast, increasing the demand for coal; also speculation in coal mines in the South of Chili has set in, and is taking off hands from the coal mines already established—all tending, for a considerable time at least, to an excessive price of coals, and as regards copper, I should think it would go higher than is anticipated in England, where I do not suppose all our difficulties on the coast have been sufficiently taken into account."

Now, as Chili produces two kinds of the copper coming into this market, it would appear from this that we may expect far higher prices than at present, and it would be prudent for holders of copper mining shares, disposed to give way, to bear this well in mind.

*Swansea, July* 1. F. J. Merry.

## THE GOVERNMENT MINES BILL.

Sir,—Mr. Tylden Wright does not appear to have given sufficient attention to that part of the Mines Bill where it is proposed that the coalowners be held responsible for propping the roof of the working places. He addressed a letter to the *Times*, some months since, on the same subject, and was shown that the fatality was greatest in those collieries where a different system was followed. Now, the object of the Legislature interfering with mines is to make the best practice universal, and in doing so it is only hastening what in the ordinary course of events would have taken place. The best proof of this is that there is not one amendment proposing to undo any one of the previous enactments. If it does put an additional penny upon the ton of coals produced, why it is the will of the people, as expressed by the Legislature, and every one is alike. I think it was this gentleman who said in a former letter that the practice would add 30 per cent. to the cost of getting coal. I am sure he knows that anyone saying so is talking nonsense.

With regard to the mode of working (long wall) practised in the Midland district, I cannot see how that alters anything. Mr. Wright says "the roof frequently gives way so suddenly that no practical number of special timbermen could prevent its falling in." There can be no doubt of this. No one expects that falls of roof will cease with the proposed system, it is only argued that they will be fewer. The first general rule says that there shall be perfect ventilation, but we all know that, notwithstanding all the care that can be taken, explosions happen. So will it be with "falls," there will always be falls, but not so many; and what is argued is that if a hundred men in a pit are left without control to support the roof under which they work, every one on his own system, it will not be so well done as if experienced men were appointed solely for setting props and seeing the roof kept safe.

Mr. Wright says that 400 miners have signed a petition stating that they wish to set their own props; well, that may be. We all know what a petition is, and how it can be got up, but nobody wants them to stay in a place where the roof is bad, or to make it criminal for a man to set up a prop to save his own head. What is intended is that in every colliery there shall be a sufficient number of persons appointed to prop and secure the colliers' working places, and I apprehend that in practice it will work as follows:—These persons will go round the places before the colliers shift begins, and twice during his shift, and set up the props after a system, and at the same time see that the place is apparently secure. In addition to this, however, the "deputy" will leave some props beside the man with instructions that if during the interval between his visits any part of his place is apparently unsafe, he is to prop it up. When he makes his visit he may either remove the prop or allow it to remain, as may seem best. In this way the propping would be systematically done, and unnecessary waste of timber prevented, while the improved supervision could not but tend to safety. It has all along

been my opinion that the adoption of the system is only a work of time. Of course, if the Legislature see fit to carry this rule, and I hope they will, it will hasten it, and so will certainly do good.

A COALMASTER.

## MINES (COAL) REGULATION BILL.

SIR,—The discussion on the Mines (Coal) Regulation Bill of last night encourages the hope that the principle of responsibility on the part of occupiers as embodied in the Factory Acts, and in the Print Works Act, the 8th and 9th Vic., cap. 22, sec. 30, will be applied to coal mines. In these Acts the occupier is, in the first instance, liable for a violation of the law, but on pointing out who is really liable, if not himself, liability changes from the occupier to the alleged guilty person.

From 1833 to 1844 the complaints of disobedience as regards the Factory Acts were numerous and continuous. On June 23rd, 1836, the late Mr. Hindley, then M.P. for Ashton, moved for leave to bring in a Bill to amend the Factory Act, but withdrew his motion, under the promise from Lord John Russell that the Government would secure obedience to the law. Their efforts were not very successful. From 1844 the law has been fairly obeyed. A principal reason has been the direct responsility of occupiers. The difference between a coal mine and a factory is great, but that difference is physical and mechanical; it in no sense touches the primary liability of an occupier under a statute. It is within my knowledge that an attempt was made in 1846 to limit the liability of mill occupiers, as such, but the leaders of the factory movement were resolute, and the attempt was abandoned. In a matter of legal liability, under a statute, why should there be one rule for the occupier of a factory or a print work, and another for the occupier of a coal mine? In a statute the words "knowingly or wilfully" would render evidence of an intention to violate the law imperative. Under the Factory and Print Works Acts, proof that the law has been violated establishes a *prima facie* case against the occupier, who, if he has used due diligence and care, has nothing to fear; if he has not, he ought to bear the burden of his neglect. Mill occupiers do not complain of the law, because, on the whole, it works well for their interests. On an average of cases the larger the number of hands employed, and the more divided the responsibility, the greater the need for the rule of *prima facie* liability established by the Factory and Print Works Acts. The occupiers of coal mines have reason to be hopeful, and after deliberation some of them may find Mr. Bruce's suggested amendment a decided improvement on Clause 14 of the Bill as originally drafted, and also as amended at the instance of Mr. Staveley Hill.

*Serjeant's Inn, July 3.* SAMUEL KYDD.

## THE GOVERNMENT EXPERIMENTS WITH DYNAMITE.

SIR,—I read with much interest, in last week's Journal, the report of the experiments with Dynamite, at Llanberis. For some months past we have been using dynamite solely for the purpose of pit sinkings at the Townley Colliery, near Burnley, in very hard and wet grey grit-stone, so as to render most other explosives comparatively useless. The advantages of dynamite we find:—1. Its power is in a small compass, and needs much less diameter of hole.—2. In porous wet rock it obviates the difficulty of properly drying and tamping.—3. As a rule it rends the stone to the bottom, and often below the depth, if the hole is bored with ordinary judgment to apportion the work, and the charge does its work clean and effective. —4. It makes but little reek or smoke; in a few days it becomes a favourite with the sinkers, and is used with perfect impunity; needing no tamping, there is no fear of firing the charge, or of cutting the fuse, nor in drilling out a missed shot. C. B.

*Bolton-le-Moor, July 3.*

## MINING INTERESTS OF LAKE SUPERIOR.

SIR,—The rise in the metal market has caused an increased activity in the mining interests of Lake Superior, particularly as regards copper and iron.

The copper mines were never in a more healthy and flourishing condition than now; and I question if there is any other mining interest in the world where the profits are so certain and satisfactory and the losses so few. It has taken, however, years of experience, and large sums expended without adequate return, to arrive at this point. The result is that few mines are working that are not paying well, while some are opening out with very flattering prospects. Lake Superior is reached now with more ease and dispatch than a few years ago, the increasing business having stimulated steamship lines to put on splendid steamboats and propellers, which, under a strong competition, insures the transportation of freight and passengers at extremely reasonable rates. There is also a railroad extending into the country from Green Bay, which will reach Lake Ause, only a distance of 26 miles from the copper region, this coming fall. To complete this 26 miles will require but a few weeks the following spring, as a strong company have the job in hand, with a lucrative land subsidy from Government to aid in completing the work.

The Calumet and Hecla Mine stands head and shoulders above everything else in the way of producing copper in the United States, if not in the world. The product in ingot copper is 725 tons per month, and the dividends are $5 per share quarterly, on 80,000 shares. This year, however, owing to great discoveries in the mine, and increased price of copper, the dividends are to be doubled, or $40 per share on 80,000 shares, equal to $3,200,000. This mine, as well as its neighbours, has been recently afflicted with a most obstinate strike, which, on the part of the miners, was very causeless. The miners asked for an increase of $10 per month, making their wages $70 instead of $60, which was granted. But while they were in the humour they thought they would strike for eight-hour shifts instead of ten, which the company absolutely refused. The miners held out 24 days, but, seeing there was no prospect of accomplishing their aim, they went to work on the company's terms. This company is putting in about 15 of Burleigh's Percussion Drills, to be driven by compressed air. Those who have used Burleigh's Drill claim much quicker execution for work done, but at no appreciable saving in cost over hand labour. Time saved in mining is money, and that alone gained is worth the effort. But it is hoped, now that attention is given towards economy in this direction, that a more perfect and economical power-drill will be discovered. It is certain, whoever introduces such a drill as is needed in all respects, has already an immense fortune assured.

The Schoolcraft Mine, adjoining the Calumet and Hecla, and on the same lode, is developing into a very prosperous property, and will this year gratify its fortunate stockholders with profits. The Quincey, one of the oldest mines, and best managed, is giving large and steady semi-annual dividends. The Pewabic, Franklin, Copper Falls, Central, National, Minesota, Ridge, and Houghton, are all earning and dividing good dividends. The Phœnix, a mine that has produced immense quantities of mass copper, and has been a rich mine for years, has never paid a cent to its stockholders, on account of glaring and gross mismanagement. The directors of this concern, ignoring the practical skill of the miner, and the shrewd sense and good judgment of the business man, hired as their agent a student from Freiberg, covered all over with diplomas, and so deeply versed in science as to scarcely comprehend the ordinary terms of language. After several years of disappointment, and getting utterly tired of excuses, they have shipped the learned Professor, and hired a practical and intelligent man to manage their affairs, and although the change has been but recent, the near future is looking bright for a fair return for the investment made.

The Houghton Mine is one of the best equipped with mining machinery on the Lake, and is owned and worked by private parties. The lode is wide, and is a masterly one. They are making fine profits. The proprietors obtained this property for a small fraction of its value, during the depressed condition of the mining market 18 months ago. The Mass, Aztec, Great Western, Knoulton, and other mines in the Ontonagon district are promising properties, and lack only capital and energetic management to be brought out as remunerative enterprises. Of course, in a country so extensive, there are a vast number of worthless so-called mining properties, but it is not easy to be deceived by the like after an experience of 20 years. The iron interests of Lake Superior, on the south shore, is increasing with a magnitude that is truly amazing. An entire county, with several large towns, and a total population of 17,000 souls, is kept up and supported solely by the production, manipulation, and manufacture of this metal. At a future day I may have something to say about this industry in Marquette and adjoining counties.

The discoveries on the north shore of Lake Superior, in Her Majesty's Dominion, is attracting much attention in that direction. The silver veins opened are remarkable for richness and regularity, and iron deposits of magnitude are known to exist within a short distance of shore; rich specimens of gold quartz have been brought from the interior, and to cap all, some explorers have brought away from that inhospitable region 3 tons of very rich tinstone, some of it assaying as high as 40 per cent. I know that all this may seem incredulous, but they are nevertheless facts which have come under my own observation.—*Lake Superior, June 15.* OBSERVER.

## MINING TERMS—No. I.

SIR,—At a recent County Court sitting in Devonshire the Judge, who was much perplexed by the use, in a case before him, of mining terms, said that he wished someone would publish a glossary of them, that they might be better understood. Living, as I do, in the centre of mining industry I have acquired, intuitively, some knowledge of the terms used in the mining districts of Cornwall and Devon, and, therefore, I will endeavour to assist in satisfying the desires of the learned judge. I shall not at present attempt an alphabetical arrangement, but take the words as they occur to my memory, leaving the arrangement till the exhaustion of the whole. Into the subject of etymology of the terms I shall enter.

*Tutwork* is a word, I believe, peculiar to Cornwall and Devon, and means the work contracted for by the miners for a certain price per fathom or yard (lineal or cubic), or in the lump, either at the surface of or in the mine. The letting of work to tutworkmen is, in underground operations, limited generally to a month, sometimes to two months, and sometimes (to prevent men from benefiting by a change of ground in their favour) to a less period than a month; when so limited it is called the "extent" system, established in some mines to keep down the men's earnings, which I consider a bad practice, tending to make men indolent in their labour, for the men reason in this way:—"If we work hard now that the ground is easy we are sure to have the price cut, so we may as well touch our pipe," plainly showing that the practice is against the interest of the adventurers. Besides, it is not giving the men a "fair chance" thus to curtail their contract, which should be for a time *certain*. Day and monthly labourers of all sorts at the mine are classed with the tutworkmen, to distinguish them from the other class of workmen, called *tributers*.

*Tributers* are those who operate on a lode in a shaft, winze, or level, or stope above or below the level, paying to the adventurers—or, rather, the adventurers *paying* to *them*—a tribute of so much in the pound out of the realised value of the mineral raised; it may be 1s., 2s., 3s. 4d., 6s. 8d., or 13s. 4d., more or less, paid to the miners out of 20s., the tribute depending on the quality of the lode. Sometimes the same men are both tutworkmen and tribute workers, from having, in addition to the poundage, so much *per fathom* for sinking, driving, &c., and may, therefore, be placed either in the tutwork or tribute list of labourers.

*Shaft* is a deep pit, generally perpendicular, but often, on reaching the lode, it is continued thereon in a diagonal direction (as lodes are seldom perpendicular), but often the perpendicular is continued below the intersection, in which case the lode is reached by *cross-cuts*, about 10 fms., apart in perpendicular distances. There are engine, whim, man-engine, ventilation, and adit shafts. In isolated cases shafts have been sunk *from the surface*, on the inclination of the lodes, for the purpose of testing their qualities economically.

*Winze* is a vertical or diagonal drift (usually on the lode), connecting two levels. It is sometimes sunk for ventilation, and sometimes for the trial of the lode in exploring the mine, and for opening the ground for tributers.

*Level*, or gallery, is a horizontal drift on the lode. Levels are commonly 10 fms. apart, and are numbered 10, 20, 30, &c., fathom levels. When there is no adit the numbering is from the surface, but very few mines comparatively are without adits.

*Lode* means the vein of copper, lead, tin, iron, &c., on which the miners operate. Lodes run in nearly all directions, but copper and tin lodes generally have an easterly strike; lead, generally northerly; iron, both northerly and easterly. I have to-day been looking at four lodes in Eskdale of a northerly strike. The *thickness* of copper, lead, and tin lodes vary from an inch or less to 10 or more feet, but one of the iron lodes in the mountain close by Eskdale is about 20 ft. wide, 700 ft. above sea level; and a lode of white iron cropping out into Perran Sands is about 60 ft. wide, but inland it is much narrowed. The *depth* to which lodes extend is unknown, except perhaps in a few cases. Very few lodes will pay for working under 300 fms. from surface The great lode at the bottom of Wheal Vor would pay well if about 100*l.* fms. only beneath the surface.

*Adit* is a horizontal drift taken up generally in low ground to take off the shallow drainage of the country around the shafts, &c., and to ease the labour of the engines, which discharged the water of the mines into and through it. The most remarkable adit that I know is that taken up near Devoran, in Cornwall, and extending through Poldice and most of the Gwennap Mines, and into Redruth parish, &c., commonly called the "county adit," sometimes "Poldice adit." It was commenced in 1748 by the great grandfather of Sir F. M. Williams, Bart., and is in length, including its branches, about 34 miles. Its greatestdepth is at Penzance Consols, where it is 70 fms. or more.

*Flookan*, or fluckan, is a clay cross-course, generally at nearly right angles to the lodes, and consists of decomposed quartz. It is also a clay at the footwall of a lead lode.

*Cross-course*, sometimes called a cross lode, because of having similar walls or sides to those of metallic lodes, is a non-metallic vein, consisting generally of quartz. Miners have found that cross-courses are "feeders" of the lodes, and that very few, if any, productive tin, copper, or lead mines exist where these courses or flookans are not present. The riches of Tresavean Mine and Wheal Buller were near a cross-course, and Wheal Damsel, Wheal Jewell, Wheal Unity, Unity Wood, Treskerby, North Downs, &c., were from lodes in contact with the "county" cross course or flookan, and so is Great Wheal Vor, &c., near a great flookan. The best part of Devon Great Consols (Wheal Maria) was by a wide cross-course; the quality and quantity of the ore diminished as distance therefrom increased. There is a great cross-course between Dolcoath and Cook's Kitchen Mines, which enrich North Roskear, the Setons, &c., but in good mines *several* of these courses exist, as in Dolcoath, Carn Brea. &c. They strike the lodes at various angles, and often "heave," or shift them.

*Heave* is a term used by miners to denote the dislocation or shifting of the lode by a cross-course or flookan. Sometimes the heave is to the right and sometimes to the left hand, and to distances varying from 1 ft. or less to 80 or more fathoms. The heave in Old North Downs is 80 fathoms, and so is that at Devon Great Consols. I have heard of one mine where it is about 100 fathoms. Cross-courses do not *always* heave the lodes, nor is the phenomena of heaves satisfactorily accounted for by any of the theories promulgated.

*Elvan-course*, a porphyritic dyke, generally containing tin in small, and *sometimes* in paying, quantities. Terras and Castle an Dinas Companies are quarrying and stamping elvan, and returning tin. There are very few good mines without elvan. It is considered as necessary for the production of mineral (especially tin) as cross courses.

*Stem* is a day's work, and sometimes a part of a day's work. Men attending to capstan if for less than a day are paid for the service as a "stem," 2s. 6d. or 3s., and the same for a journey, or, indeed, for any work not exceeding one day in its performance, and not coming under the contract system or tutwork. There is a book kept at the mines called "stem book." I believe it contains sometimes "half-stem;" if so, it means half-day.

*Job* means a piece of work of small extent, and is sometimes applied to any kind of work. Miners say, "I am going to a mine to seek for a job"—that is, for employment.

*Stent* means "extent" abreviated.

*Country*, the stratum rock or strata through which the lodes of the mine pass, generally granite or clay-slate, or both.

*Stull* is a strong boarding placed over a level on which is put the rubbish or debris from the ground above instead of sending it to surface, when there is space from the excavation of the lode to contain it, and the placing of it there is called "putting it to stull."

*Stemples*, a word used in mining leases. I suppose it means the wooden framework placed in the levels to keep them open, where they would otherwise collapse. Very often the covenant of the lease is violated by the removal of the stemples, except in adits.

*Whim* is a mechanical contrivance for drawing to surface the broken materials, ores, &c., and consists of a beam about 35 or 40 ft. long below a circular cage, around which the rope attached to the kibble is placed, and the beam is turned round by horse-power, winding the rope round the cage, drawing up the kibble, while the other end of the rope being attached to a descending empty kibble lets it down, so that it has double action. The long beam *over*, and confining the whim, is called the *yam-beam*, and is, of course, longer than the moveable beam. A *steam-whim* has the same *principle*, but with formal modification.

*Whips-a-derry* (I am not certain of the spelling) is another mode of raising the materials, and consists of a pulley-wheel placed over the shaft with a rope, one end of which is attached to a kibble and the other to the traces of a horse. The horse walks off from the shaft, and pulls the kibble after him to the surface. In this contrivance there is only one kibble, and there is no *leverage*, as in the whim, but it is cheap, and usually temporary mode of raising the stuff when the shaft is shallow.

*Stuff* is the material broken underground, whether it be ores or *d.brin—i.e.*, tinstuff or deads.

*Deads*, useless broken rock or "country," not fit to be saved or dealt with in metallurgical operations.

*Kibble* is a bucket in which the ore or rubbish is placed to bring it to surface. The man who fills the kibble is called the "kibble filler," and the man at the surface emptying its contents is called the "lander."

*Spale* is a fine of 2s. 6d. or 5s., more or less, charged to a labourer for the violation of some rule in force at the mine where he works, and is notified by a writing posted against some door in the mine (as the smithy), in such form as the following:—

"Notice, John Thomas is spaled 5s. for being absent from his 'coor' yesterday.
——— Mine, June 26, 1872. Signed, ———, Mine Agent."

The fine is deducted from the money due to the person fined, and, I suppose, goes to the credit of the company.

*Coor*, sometimes spelt core (corrupted from corps, French), means the period of time daily devoted to underground work by one set of men. In some mines there are, or were, four coors—first and second coors by day, and first and second coors by night—*i.e.*, six hours to each; but at present I believe the men work more hours, 8, 10, or 12, so as to make one day and one night coor, or it may be three coors of eight hours each, as may be arranged by the manager.

*Croust* is a lunch taken by the miners, sometimes in the forenoon.

*Hoggan*, pasty baked in the form of a pasty, crescent, circle, or ellongated ellipse, containing usually a piece of meat or a shelless egg covered in the centre. Like a pasty, it is a portable meal much used by miners and others.

*King of Prussia Inn, Eskdale, Cumberland, June 26.* R. S.

## N. ENNOR ON ENGINEERING, AND STAMPING TIN, &c.

SIR,—I said some weeks since that I should some day give the outlines of my practical experience in mining and machinery; this I think, after the remarks of Mr. Schmidt on stamping, I am now bound to do, as I am about to bring out a new method of stamping tin ore; but before doing so I may repeat what I said before, that I am not a novice to either, though a self-taught man, only educated from the book of Nature. I was shown that book and read it 70 years ago, always using it as my guide, and from which I have reported on more mines than any man living. I challenge the world. I never was bought over, and never published a letter without my name being attached. I ask my employers if a single mine has ever proved productive in or below any ground laid open at the time of my inspection that I condemned? I have a mass of reports that are unpaid for where I gave candid opinions—they would not suit my employers, but that never caused me to give a report to suit party purposes. I have been offered tempting bribes, but no one will dare to charge me with taking one.

I next turn to engineering: I may remark that I opposed the driving of the Box Tunnel; it was needless, and a waste of money. This brought Stephenson, the celebrated railway engineer, into Cornwall, to consult me on the subject. He was satisfied that he came again, accompanied by Mr. George Raney, Mr. Miller, and Mr. Gould. They were convinced that I was right. Such useless tunnels have not been driven since, neither will they be again. I have since surveyed and reported on Mont Cenis Tunnel, where I found the gradient to get up was 1 in 20; all that is wanted are engines of sufficient weight to cause friction on the road to overcome the load behind.

Then I may ask if such celebrated men ever came hundreds of miles into Cornwall to consult any other man? I condemned Brunel's plan of attempting to launch the Great Eastern broadside. I offered to excavate a dock, and keep out the water for four years, for him to build it, for the sum of 20,000*l.*, and to float her out; and it cost 100,000*l.* to launch her. I told him his South Devon atmospheric line would not answer; he said I knew nothing about it; I said I should know enough to remind him of it when he found out his error. It was I who first proposed the 4½ foot crank for the rotary engine for lifting heavy weights, when three or four of the leading engineers of the country opposed me, and refused to put up such engines, and I had to put up one myself at Delabole quarries. Some of these engineers are still living, who know it is correct, and were compelled to adopt it. I also opposed their two combined cylinders: that ended in smoke. I got up the suspension railway chains for drawing heavy loads from quarries, or loading ships off cliffs. I got up the first travelling cranes for Messrs. Johnson, for the Dartmoor quarries, and Plymouth breakwater—the first they erected in London was at their granite yard in Pimlico; two or three were used in building the Houses of Parliament, and now nothing can be done without them; they are used by hundreds in every country of note.

It was I who gave the first drawing for the air furnace to John Yelland, of St. Stephens, in Cornwall, a man who had been my foreman smith for many years at Delabole quarries, he was then at Milwall, turning the large 10-ft. locomotive wheels, I think, for Cottam and Allen, where they were attempting to turn them, as the country smiths do at the present day, with the bellows and forge. In doing this all the workmen were nearly roasted alive. They built a furnace on my plan; when they found it was a success they sent me a *sovereign*, which I returned, saying I did not take anything for such trifles as that, and they gave the sovereign to Yelland, the smith. This furnace is now enlarged, and used to weld every plate for the plating of the ships of the Navy and garrisons, I have had to oppose all the armour plating of ships sides, as they should all be plated at the angle of 45°, when at that angle, and the egg-pointed shot now used, would cause the shot to diverge, and not enter the plate; it would have no hold on the upper side, and would fly off. I have ever opposed the turn-turrets of ships as useless and cumbersome: they are not wanted. If ships were plated at an angle of 45°, on hard wood backing, it should be a turn-table under, with two or three guns on it, to be used on either side as required. I contend that the so-called educated men have attempted to turn Nature's law of gravitation *vice versa*, when they advocate building ships with ¾-inch iron bottoms, and from 6 to 10 inch top iron plating, and the turret mounted above. I told Sir John Burgoyne what would be the result of them before the loss of the Captain. Unfortunately for me, on leaving his house at Paddington, I slipped my foot and broke my leg.

I openly condemned the new iron garrison for Plymouth before it was commenced, and it turned out as I said—a failure. They have since had to lay on 15 inches of iron and concrete, and it is useless now, as it is so upright that every shot is bound to enter, if fired within a short distance, from the recently made large guns. Were the ships and garrisons plated at an angle of 45°, not one out of 50 would go through; they would not get a hold in the plate at that angle. I hold letters on these subjects from Mr. Kendall, late county member; Mr. Williams, the present county member; the late Sir John Burgoyne, Sir John Pakington, and Colonel Jervois, who has been selected to point out and plan all our more recent fortifications. I hold letters from many others of England's leading men on these subjects; not one opposed me. I wrote a pamphlet and circulated it, many years since, on how to protect England's shores by open trenches; it has been since tried on Dartmoor, where it exceeded my report.

In conclusion, I have only to remark that England's old wooden ships are to be converted into the best war ships afloat, at a small expense; ships that will run down any iron-clad afloat. I will not carry this any further now. I am driven to make these remarks to show I am not a novice in mining, nor its machinery, but I am getting old. I may be, like all other engineers, liable to make mistakes: if so, I ask your readers to pardon me, as my intention is good. I am not doing this for bread and beef, but seeing the extraordinary price of tin, I long to see improved machinery brought out to enable those engaged to bring more into the market at less cost. In my next I take up tin stamping and dressing. N. ENNOR,

## MINING v. RAILWAY AND OTHER SPECULATIONS.—No. II.

SIR,—Will you permit me to follow up the letter which you published in my name last Saturday with some further remarks pertinent to the subject? I have set forth, I think, the superiority of mining over other forms of investment. It is very necessary, however, that the operations at the mines be conducted in an efficient manner; and investors should invariably take means to ascertain that such is the fact. The mine should be worked to practicable depth. Machinery adequate to the working should, *ab initio*, be provided. "Saving is losing" holds good in this particular. "There is that scattereth but yet increaseth" never held more obviously true than in providing amply the capital necessary for working an English mine.

No one can have much experience of mining without perceiving how a large class, who will enter with tolerable readiness upon an adventure, and pay the deposit, allotment, and first call with alacrity, button up their pockets after, and expect the whole undertaking to be worked by one-half, or one-fourth, what the estimated capital announced. And if the slightest accident occurs, or a good point ceases to be all it promised, how ready they are to shirk their engagements, without giving the enterprise a fair; trial and even to embarass the company with legal disputes to its ruin, and their own irreparable and totally unnecessary loss. A history of the Stannaries which comprised the nature of all suits waged there within the last two decades, or even the last lustrum, would be a very instructive production, and show the investing public what injury mining has sustained from the folly and fatuity of a large class of investors themselves. It is necessary that well manufactured and complete apparatus be had for pumping water, drawing the stuff to surface, crushing, stamping, &c.

On referring to my "Statistical Returns of Cornwall for 1864," a work most liberally and favourably received by you, I find that at Clifford Amalgamated Mine there were these engines at work—one 90-in., four 85-in., one 60-in., one 30-in., one 4-in., and a 30-in. man-engine and crusher united. To keep the whole of this vast machinery at work every man was obliged to attend to his own duties, and confine himself to the position he was competent to fill. It will be admitted by all how important this is, from the engineer to the stoker, and to the man who looks after the stamps.

It is not here my intention to show the advisability of an engineer being placed in the position of a practical miner, I only insist upon a system of operations so complete, and so adequately provided, that every man and every piece of material operative instrumentally be put in its place and kept there in a state of undeviating efficiency, according to the well-known maxim of one of our great founders of schools—"A place for everything, and everything in its place." So it should be. Our great Milton sung "Order is Heaven's first law," and when man imitates this he secures to himself one of the greatest elements of harmonious progress and ultimate success.

If I do not, therefore, place the engineer in the position of the practical miner, neither would I put the latter in the place of an ore dresser. In mine working there should be no confusion, plan and sequence should illustrate one another; so it is with the ores as God has distributed them, so let it be in our efforts to extract and utilise them.

Mining is not to be pursued as a common operative trade, it is a science, and must be conducted on principles that are recognised.

It is often injurious to bring men from one district to another. Each region of metalliferous production has its own peculiarities, and it requires familiarity with them to work efficiently, and therefore economically, for the proprietors. This was lately exemplified strikingly in Somersetshire. Colliers were brought from the thick seam districts of the Midland Counties, and found themselves totally at a loss to work the thin seams of a foot or two in thickness

in Somerset, and some of the Somerset turnouts, when they went farther north, discovered that they were not competent to work the thick seams, until, after unremunerative time, they gained experience. When the Cornish miners, some time ago, emigrated to the Black Country, Wales, and the North of England, it took a considerable time to drill them into the discipline of their new service.

What can a man or manager of a mine in Cornwall know of a mine in Cardiganshire, Flint, Montgomery, or Glamorgan? The indications are different, so is the rock and the character of the lode; yet a gentleman sent from Cornwall for the inspection of such mines is expected to give something like an accurate opinion of their character and prospects. Apart from general geological knowledge or mineralogical theory, or even practical information, it requires a person to possess a profound district experience to give a correct opinion upon inspection, or to work a mine in any particular mineral region. It has now become the practice of firms, syndicates, and companies to send down a man, with the title of professor of something or other, it may be geology, chemistry, metallurgy, mineralogy, assays, or any other good thing really, or grand thing in sound, who is very little more competent to pronounce an opinion upon the mine, as a mine, than the secretary or clerk to the company, firm, or syndicate that performs this exploit. Possibly the learned professor thus put upon a mission to a Cornish tin mine would be very competent indeed to report upon a slate quarry in Wales. You might as well send a man because he was a useful Member of Parliament to inspect a mine in Utah or Colorado.

*The Times*, and other journals, have shown the inadequacy of the inspection in the notorious case of Mineral Hill; this we adduce because the exposures have so recently appeared, but *ex uno disce omnes*—that is to say, all of the classes so treated, for a good mine may be ruined in its reputation by a wrong inspection. Mines are sensitive—like Cæsar's wife they must not be suspected. Take the Flagstaff and the Emma, as well as Mineral Hill, to show how much may be lost where so much may be won.

We have calculated that 1,250,000*l.* has been lost within a very short time by the process of inadequate inspection of mines remotely situated, a glowing prospectus of what the incompetent inspector thought, or thought proper to say; and the public, after glancing at the title of the verifier, and finding that he was an F.G.S. or an LL.D., or an A.S.S., running in with their subscriptions without taking the trouble to consult an experienced person at the expense of a guinea, or it may be two guineas.

Finally, Mr. Editor, while I maintain that there is no investment comparable to mining, it is my duty to say, as a practical miner, with a life's experience of practical mining, that investment here should be intelligent, and under wise and experienced advice.

*Gresham House, July 4.* THOMAS SPARGO.

## GREAT LAXEY MINING COMPANY.

SIR,—The directors of the Great Laxey Mines feel much indebted to you for the forbearance shown by the *Mining Journal* in avoiding the publication of articles calculated to foment and keep alive the unhappy feeling which has caused the "strike" of our underground men, and we have regretted that the same prudent course has not been pursued by other newspapers. Parties have thought fit to publish untrue statements in reference to this unhappy affair, calculated to create hostile feelings amongst the shareholders, thereby shaking their confidence in the directors, and inducing the men to believe that the shareholders will supersede the authority of the directors.

We have been quietly but constantly pursuing a course of investigation by which we expect to make this unhappy "strike" turn out greatly to the benefit of the shareholders and miners, and we thought it best to wait patiently until we could lay the whole matter before the shareholders. We find, however, that so many false and mischievous statements are being published, that we have determined to forward a circular to each of the shareholders, which we hope will tend to make them hesitate before they believe the scandalous statements circulated as to all the managing directors, and especially as to me—upon that curious principle that those who work the hardest are entitled to the greatest portion of abuse.

*Douglas, Isle of Man, July 3.* GEO. W. DUMBELL, Chairman.

## THE STRIKE AT THE GREAT LAXEY MINES.

SIR,—Visiting London on business matters, I called at my brokers, and, among other things, enquired as to the position of my Great Laxey property. Of course, I had heard fully as to the unfortunate strike, but to my astonishment I was informed that from errors and differences among those to whom the management of the mines is confided the quarrel with the operatives is likely to be indefinitely prolonged. Now, I have every confidence in our excellent Chairman—indeed, in all our officials—therefore, I should be glad to be informed what has occasioned this change of conduct?

Strikes appear to be so general that we cannot wonder at one occurring at our mines; but what I wish to learn—and, of course, all others who are interested in the property have the same feeling—is a true statement as to the origin of the strike, what has occasioned its prolongation, and when it is likely to terminate. Surely such an important property as the Great Laxey Mines should be so managed as to be a source of comfort and happiness to those employed as well as to the proprietors.—*Liverpool, July 1.* A SHAREHOLDER.

## THE STRIKE AT THE GREAT LAXEY MINES.

SIR,—This most unfortunate event has become a matter of extreme importance, placing all concerned in the management in a most trying position. It appears that Mr. Thomas Thompson, the former secretary to the company, became cognisant of irregularities to which he felt bound to call the attention of the directors: this not being a palatable proceeding, he was summarily dismissed. Had the directors acted upon his timely advice, in examining the cost-sheets and enquiring into matters to which their attention was then drawn, the present difficulties might have been avoided. Let them now meet, and act as becomes men of business—closely examine into the true position of their affairs; ascertain all delinquences and remedy all defects; and start the concern in an honest manner, by paying the men fairly and having them honourably superintended.

If there has been bad management, all concerned in the property must lose by that; but crimination and recrimination will effect nothing: atone for past errors by increased vigilance in the future. The property is valuable, and fully able, if properly managed, to weather through all apparent difficulties, and become again as prosperous as ever.—*City Club, July 3.* MENTOR.

GREAT LAXEY MINES, AND THE STRIKE.—The "Miners on Strike" have addressed a letter to the shareholders. They say:—

"We are informed that it has come to your knowledge by the directors of your company having issued circulars, stating their refusal to declare the last quarterly dividend, in consequence (although we cannot see how that dividend ought to be affected by what we have done) of the Great Laxey miners, including all underground men, having now for about three weeks been on strike for an increase of wages. We, therefore, think it to be our duty respectfully to state to you the circumstances and reasons which have led us to do so, and we do this the more anxiously as we are of opinion that your Chairman of directors is mainly the one who is most opposed to us, and as he did on the 25th inst. declare to a deputation of several miners, who waited upon him, again refused to consent to increase our wages. We have to ask you, therefore, is the unbending will of this one man to keep from us our rights, and by doing so continue to close up your mines? We assure you that it has been with very great regret that we have felt ourselves compelled to adopt the means which we have done in order to obtain what we have asked for, and that we have only done so after four petitions, severally addressed by us at different times to the directors, praying for an increase of wages, had been rejected by them. One of these petitions was sent to the directors some few years ago when in London, in order that you might then in your general meeting have an opportunity of discussing the reasonableness of our request; but the only notice which your Chairman condescended to give it was unsparingly to condemn it, and to frown it down in such a way as to crush out of us, if possible, any hope of ever improving our means of livelihood. His own arbitrary will has for some years persistently refused any improvement in our circumstances, and now, we think, unreasonably and cruelly, continues to do so. No other means, therefore, are available to us: we must either continue to submit to what we consider to be unfair treatment from him, or go out of the mines on strike, and hence we have been driven to do the last. The resolution to which we have pledged ourselves is:—'To have an advance of 4s. per week for all underground men, whose present average wage is 17s. per week.'"

They then very fully state their reasons for requiring the increase in their wages, and conclude:—

"For these reasons we beg you to consider our present position favourably. To us, doubtless, what we have done is a very serious matter, but not to us alone. Probably you, too, are losing 100*l.* per day of profits, while we are losing our wages. We fully realise that our strike is involving the loss of positively 250*l.* per day, as the raisings of the mine might now produce that amount. It is not, then, wholly for ourselves that we ask you to meet our reasonable wishes as quickly as possible. Lastly, your Chairman has threatened to bring over other men to work your mines. We do not believe that he can get competent men: first, because they have better wages in England than we now have; and, also, because no men would come here knowing that hundreds of men are on strike; but, in addition, we fear the attempt to carry out that threat might entail consequences the possibility of which we can only think of with pain. Wish every wish for the prosperity of your mines, and desire to render you a just and hearty service."

## SHROPSHIRE MINING.

SIR,—I see reference made to my late father's opinion by Mr. Geach, and Mr. Peter Watson, at the late meeting of the South Roman Gravels Company. May I be permitted to say that in the present working of some of the Shropshire setts I have been surprised at the small attention paid to the experience and results of former companies? A suggestion that you yourself, Sir, once made to me has, therefore, often occurred to my mind, that it might be useful for me to have an engraving struck from my father's model of the lead mining field of Shropshire, which obtained a prize medal in the Exhibition of 1861, for private circulation, with historical notes, as far as they can with accuracy be collected, of past workings of the mines.

I have been deterred from acting on your suggestion from the opinion expressed to me by some mining friends that such a publication might seem to be an advertisement, where none is required. I notice, however, in the same number of the *Mining Journal* the Chairman of Pennerley and Bog stated his opinion to be founded on the reports of workmen who have seen the former working of the mines; and surely, if properly tested, such experience, or rather knowledge, is a useful element in determining future operations. In the report of the South Roman Gravels Company, lead seems to have been stumbled upon by accident, at the point at which, as Mr. Geach said, my late father, had he been a younger man, might have liked to have amused himself by making a trial, before the present company had the sett.

The former facts connected with the present discovery were that the old Grit Company, alluded to at the meeting, discovered, and were perfectly aware of, the vein discussed at the aforesaid meeting, and went to some expense in preparing to work it. They had, however, engines at both the Grit and Gravels, and were producing 200 tons of lead per month, and were also engaged in the extravagant idea of driving the Leigh level from near Worthen to the Gravels, when, the price of ore being extremely low, they abandoned the idea of erecting a third engine. I am not sure whether Mr. Ward, who worked the Grit to a much greater profit for about the same term of years (19) that it was worked by the old company alluded to, was lessee also of the Round Hill, which is not on the same property as the rest of the sett; but if he was lessee of the Round Hill also, as he had six veins bearing ore in the Grit sett, he had no occasion to go to the expense of another engine for the purpose of trying new ground.

It is needless to say to those who knew him it was the Grit sett of which my father had the highest opinion, and this based not only on "the life-time of practical experience," which Capt. Waters in his report states to be of secondary importance, but "on the plain figures of lead sent into the market," which he gives as the true test of a mine in which, in the two periods alluded to, the Grit sett has equalled the amounts given by Capt. Waters as the produce of either Tankerville at the present time, as has been stated, or Snailbeach, as can be shown. Time may show whether the opinion my father entertained of the Grit side of Shelve Hill is as likely to prove correct, as the view he always took of the Roman Gravels end, and Tankerville is now proving to be, or, rather, as Sir Roderick Murchison expressed it in his late visit with me to the district he knew so well, the success of the old mines will probably be in proportion to the amount of capital that can be brought to bear on opening the old ground at greater depth, and trying more of the virgin ground at that part of the hill which has never been in the hands of any but private companies, or individuals, but which now, by an agreement which has taken effect, be transferred to public companies. Though I know my father, were he alive, would regard with great interest the proposed trial at the South Roman Gravels, the strong opinion he was well known to entertain of the Grit sett must not be mistaken for a view taken of the South Roman Gravels sett, for which a company was formed only at the end of his life, too late for him to say much on the subject. R. JASPER MORE.

*Linley Hall, July 5.*

## LEAD MINING IN SHROPSHIRE—THE BOG MINE.

SIR,—In next week's Journal I purpose making a few comments upon the strictures passed upon me by Col. Corbett, the chairman of the general meeting held on June 26, and I request the shareholders to suspend their judgment until then.

*Cornhill, and Shrewsbury, July 4.* E. CAVENDISH TAHOURDIN.

## SOUTH TOLCARNE MINE.

SIR,—On June 27 Joseph Vivian and Son and James Paul write to the effect "that there is every prospect of our having a good copper mine." Again, the remark is repeated as to its merits and prospects to become a good tin mine. Now we find that there are no less than six lodes to be worked upon, all of which will, there is little doubt, leave handsome profits to the shareholders. In the south lodes the shaft is already sunk over 45 fms., and a level driven to intersect these rich lodes.

It is simply a question of a very few days to bring to the surface the splendid ores now struck. The unfortunate accident in South Condurrow Mine gives its formidable neighbour and rival, South Tolcarne, time to develope its riches. The north lodes were worked a few years ago at a depth of 110 fms. from surface, and the South Condurrow lode has been actually struck; but there was no machinery to pump out the water, and tin too low in price to be worth prosecution or further search. Here, then, lies an enormously rich mass of tin to develope and dig out, neglected from ignorance and want of capital, which South Condurrow has well proved for this mine. EXPERIENTIA.

## THE EMMA SILVER MINE.

SIR,—In the name of the residue of the Emma shareholders, I thank our enemy for writing a book. When he takes up a pen the ears of the cunning animal peep from beneath the skin. Perhaps you would not mind reprinting the short letter from Mr. Lyon, which preceded his telegrams, &c., as published in your last Journal. Of course, the more his benevolent effusions are made public the better pleased he will be. The following was his letter:—

"Subjoined I give all despatches received by me to date, together with all telegrams published here by the company, also a letter from Mr. Johnson, published in the *Standard* this morning.

I desire the public to read and consider my despatches in contrast with those published by the company. The former came from *independent sources*, and *are true* in every particular.

It will be observed that the company's despatch, received June 7, reported 'all going on well' at mine, and that Mr. Park despatched from New York, June 10, among other things, 'mine all right.'

The untruthfulness of these despatches is palpable on reading the other reports, and Mr. Park must have read the despatch in the *New York World* of the 7th before sending his cablegram on the 10th.—JAMES E. LYON."

Now, statement number one may be true or not. If he had received any despatches not in keeping with his "bearing" operations it is certain he would not have published them.

Statement number two was false, since he repressed a telegram received June 13, and published by the directors, as well as one from Mr. Park, stating that the mine was in trouble.

With regard to the next sentence, referring to Mr. Hiram Johnson's letter to the *Standard*, it may not be out of place to remark the curious coincidence that the *Standard* was, as far as I saw, the only daily paper which threw open its columns to Messrs. Johnson and Lyon, and so assisted them in carrying out their avowed object of "bearing" the shares of a company in which they had no interest, except such as the fox had in the cheese, as long as it was in the crow's beak, whilst I have reason to know that its columns were closed to any warning voice from the shareholders, whose interests were being so grossly attacked.

In the next paragraph we are told that Mr. Lyon's telegrams come from "independent sources, and are true in every particular." Whose agents are Messrs. Almy and Dalton, and who pays these independent gentlemen for manufacturing, or, if you prefer it, searching out the truth, and telegraphing day by day to the equally independent gentlemen in London, who, having no interest whatever in the mine, devote their lives and fortunes to the one grand aim of elucidating the truth? How Quixotic of Mr. Almy to capture the dump and telegraph his success beyond dispute. And the poor foreman; how sad to think that it was necessary to sacrifice him in the cause of truth.

Lastly, instead of its being impossible, it was very probable that the manager, living 27 miles away, did not know for two or three days that a cave had taken place in the mine. The captain of the mine would most certainly keep it to himself until he had ascertained its extent, and tried to remedy it; he would have been the last person to send off post haste to the manager. It was quite possible for the rumour to get into the papers before either the manager or Mr. Park had been informed about it from the mine; and most assuredly they would not have believed mere reports.

So much for the value of Mr. Lyon's letter, and now for his circular issued in the sacred cause of truth. What reasonless creatures of impulse he must take his fellow men to be when he tells them—

1.—That he took legal proceedings to prove his claim to an interest in a property which could only involve a useless expenditure of money, seeing that, according to his own account, there had been no ore "yet discovered," and in which he had not the "slightest idea that any will be discovered."

2.—The fight over this oreless mine was so fierce that no less than 12 attorneys were engaged on one side alone.

3.—That his claim was "based on the supposition that the course of the mine was in a north-west and south-east direction," and that it was proved to the satisfaction of the Court that such was its true course.

4.—That notwithstanding his having sold to the company for a consideration his claim to this mine running north-west and south-east, we have only a right to work north-east and south-west. [I might here point out that Prof. Silliman, in his report accompanying the prospectus, gave the direction of the Emma Mine as north-west and south-east.]

5.—That the mine, an interest in which he claimed and surrendered, really belongs to at least three other claimants, whilst a few lines further on the possible claimants have risen to "not less than 40."

6.—He asks us to believe that different people have bought, and sold, and taken nearly 30,000 tons of ore from a mine which did not belong to any of them, and that the rightful owners never objected; or, if they did, that the American courts of justice would not listen to them.

If people are frightened out of their property by trifling accidents, exaggerated by men who can write such rubbish as the above, I can only say that they have no one but themselves to blame.—*June 26.* A SHAREHOLDER.

## MOUNT DALBY MINING COMPANY.

SIR,—As you appeared to feel a delicacy in allowing me, through the Journal, to ask a question which I considered an important one, as having a reference to facts upon which I was anxious to obtain clear and positive information, and which, I believe, is of vital importance, more especially to investors in the above company—whether Mr. Entwistle, the vendor to the company, and Messrs. Grosvenor, the brokers of the company, are one and the same person—I wrote to them on the 24th inst., and have received from them this morning a letter, which they require me to publish, along with mine to them, and this I trust you will find room for on Saturday next. I would ask your readers, in considering these letters, to bear in mind the following points.—1. That Messrs. Grosvenor and Co. are entire strangers to me beyond this particular matter.—2. That they voluntarily sought me, in answer to my letter to the secretary of the company, and admitted the wrongs of which I complained, promising redress, which has never been made, but shielded themselves under what the crown agent's letter proves to be a mere excuse.—3. That they have carefully abstained from answering, or in any way noticing, my letters published in the *Mining Journal* during the past few weeks; although their complaints in your last issue about anonymous writers show that they have not shut their eyes to what has reference to them.—4. That they decline to give me a plain answer to a plain question, and seek to conceal the evasion by an attack upon me and the companies I represent as secretary, which cannot have any reference to the point at issue. For his information, I beg to say that three of these companies are private ones, none of them have shares in the markets, and the shareholders are well able to look after their interests without extraneous aid. I subjoin my letter to Messrs. Grovenor and Co., and their reply, on which I leave the public to form their own opinions. WILLIAM C. BEW.

*Colonial Buildings, Liverpool, June 27.*

### MOUNT DALBY MINING COMPANY (LIMITED).

SIRS,—As I have been informed, from more than one source, that the Mr. Entwistle, in whose name the license of the sett now being worked by the above company was granted, is the sole member of your firm, will you have the goodness to inform we whether this is so, and whether he is the "Mr. Grosvenor" who called upon me on May 2? A direct and immediate reply will oblige, as this note is intended for publication. WILLIAM C. BEW.

Messrs. Grosvenor and Co., Colonial Buildings, Liverpool, June 24.

### MESSRS. GROSVENOR AND CO.'S REPLY.

SIR,—We are not aware of you or any other party having claims against us of any nature whatsoever that can render an answer to your letter necessary. We treat the same as a simple piece of impertinence; indeed, your impertinence is only exceeded by your audacity and ignorance of business matters, which is astounding for a person holding the position of secretary to four different mining companies—the Douglas Head, the Falcon Cliff, the Golden Grove, and the Gwaenysgor—and should, therefore, have some little knowledge of business, or we sincerely pity the shareholders. We need not, as if the above companies are working investors therein are probably aware. We can only say we do not find them quoted in the lists of the *Mining Journal* of the day. Evidently your whole time must be taken up in writing long, rambling, but wary letters, with the intention of annoying a company whose success is apparently raking up all the bile in your "Petit Corps." Permit us to refer you to Æsop's Fable of the "Viper and the File." And as you state in your letter that it is intended for publication you will please oblige us by publishing this reply *verbatim*, at the same time and at the foot of yours. We may state that in case of your omitting to do so, or any part thereof, we shall be compelled in justice to ourselves to publish both, and leave the public to judge between us.—W. C. Bew, Esq., Liverpool. GROSVENOR AND CO.

[For remainder of Original Correspondence see to-day's Journal.]

MOSSDALE LEAD MINE.—This valuable mineral grant is situate in Wharfedale, near the town of Grassington, in the West Riding of Yorkshire. The extent of the property is about 300 acres, and it embraces all the best known veins which run through the Conistone royalty. The mine has been worked for some time at considerable profit. The balance-sheet, made up to the date of the launching of the present company, shows the produce of lead ore from May 31, 1870, to be 258*l.* 15s. 7d., and the total cost, including royalty, 1833*l.* 19s. 3d., leaving a net profit for a period of 20½ months of 749*l.* 16s. 4d., equal to 41 per cent. per annum on the outlay. Since then another sale of ore, at the rate of 19*l.* 3s. 6d. per ton, has been made, realising, after deducting the royalty, 250*l.* 2s., at the cost of 160*l.* 7s. 11d., leaving a net profit of 89*l.* 14s. 1d. The company enters into possession on the 10th of next month, when it is anticipated that the additional capital to be expended will increase the profits to between 3500*l.* and 4000*l.* a year. There can be little doubt about the value of this property, which now for two years has in private hands, with very inadequate capital, produced such highly favourable results. The adjoining mine, belonging to the Duke of Devonshire, made in one year a clear profit of 70,000*l.*

SOUTH CWMYSTWITH.—Mr. Thompson in his "Investment Circular and Share List," says—"I have taken great pains in the inspection of this property, and firmly believe it to be one of the best ventures in Cardiganshire. Everyone knows Cwmystwith Mine, its immediate neighbour, and the immense returns it has made, and Capt. Wm. Mitchell, who has been 25 years engaged as agent, does not hesitate to say, in speaking of South Cwmystwith, "I believe this to be a capital piece of mine ground, and the best adventure I know of in Cardiganshire. I have always had this opinion, and it is held by all competent mining men that I have spoken to on the subject in the country." The mine has been reported upon by Capt. Wm. Mitchell, the manager of Cwmystwith; Capt. Walter Eddy, Capt. James Nancarrow, Capt. S. Mitchell, manager of Mold Mine, Park Mine, and Minera; Capt. J. Barret, the manager of the Hodborrough Iron Mine, Broughton-in-Furness; Capt. John Kitto, of Llanidloes, and Capt. Henry Dennis, manager of the Great Snailbeach Mine, Shropshire. I have also authority for stating that Prof. Warington Smyth, the Government Inspector of Mines, and Messrs. John Taylor and Sons think very highly of this property."

VIRTUOUS LADY.—The following report on this mine, by Capt. Wm. Teague, of Carn Brea Mines (June 25), has been forwarded to us for publication:—Agreeably with your wishes, I inspected the Virtuous Lady Mine, on the 20th instant, and herewith send you the following report, with my recommendation for the future working:—I found on examining the Virtuous Lady part (or copper part) of your extensive sett two or three well-defined lodes, the most southern one of which I call No. 1, is small, and the character of the ground hard, and not very congenial for the production of copper; this I should not interfere with for the present. The next to this to the north, or No. 2 lode, is of a more promising character, and in more congenial strata for the production of copper ore, and which I should recommend being opened on for a few fathoms, which can be done at easy cost, with favourable chances of making a discovery. The No. 3 lode, or the more familiar name to you, the south lode, is rather puzzling for the present, as in the early drivage, it had a north underlie for several fathoms. In a shaft sunk under the level, the agent says, it has changed to a south underlie, and in the present end it appears to be one of those flat courses which have produced several hundred pounds worth of copper ore, very similar to those worked on in the old mine, and which yielded to former workers many thousand pounds worth of copper ore, rich in quality; but I do not think the lode or flat course contains so much gossan as the one formerly wrought on, and possibly the ore will not be found of such a high percentage for copper. Some men are now engaged in stoping the bottom of the level, east of the shaft mentioned above, and about 4 or 5 fms. east of shaft, and are raising ore, possibly in paying quantities; your agent appears to have a high opinion of this flat course of ore, therefore I would recommend that four men be put on here, and that the workmen be urged on for at least two or three months, when the results would speak for itself, and would guide you as to future explorations. At the mouth or entrance of this level the caunter lode forms an intersection; I would recommend that the point of intersection be found, and that a shaft be sunk directly where the intersection takes place. This I think is about one of the best features you have in connection with this part of your mine. The Poldice, or tin portion of your sett, is also a large one, which is traversed by two or three lodes, all producing tin, and making into the hill, which rises very abruptly, hence it will give backs of some 20 or 30 fms. in about the same number of fathoms driving, thus offering good chances of success if developed properly, which can be done economically by taking up your levels in the valley at the lowest point, and driving on the course of the lode into the hill. I have not the least doubt but that the whole of the outlay will be met by the returns made from the tin that will be thus raised from the opening up of the lodes, and with the chances of making large discoveries for more extensive workings hereafter. I cannot help making this remark, that in my experience I do not remember ever seeing such facilities for working a mine as there are to be found for working the Virtuous Lady, both at the tin and copper parts. Seeing the amount already laid out for it in erecting the machinery, such as water-wheels for pumping and winding, and also for stamping, with stamps already complete, and dressing-floors, &c., and that no further outlay would be required beyond employing a few men, say 20 in number, the mine ought now to be worked for about, at most, (say) 200*l.* per month, to include agencies, rent, and everything required to make a thorough trial. To leave this property without carrying out these trials would, in my opinion, be a very great pity, and possibly a mistake.—WM. TEAGUE.

APPRECIATION OF SERVICES.—Capt John Lanyon, jun., of Breage, left this county in the latter part of 1870 for the Island of Borneo, under the direction of the Borneo Mining Company, as dresser in their mines of cinnabar and antimony, and on Dec 30, 1871, was unfortunately drowned in the Sarawak River on coming ashore from the steamer in a dark night. We hear that the directors, although he was only 12 months in their service, have placed the handsome sum of 250*l.* at Messrs. Bolitho's bank for the widow and children; and also that the officials and employees at the mines have placed a further sum of 50*l.* at the bank for the same object.

## Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XLII.—We have now arrived (said Mr. SMYTH) at a portion of our subject which is purely mechanical, and for the present may lay aside those mineralogical, geological, geographical, and chemical considerations which have had to be looked at as we have proceeded. Of these purely mechanical questions we will review, first, those which relate chiefly to the haulage underground along horizontal planes (or nearly horizontal) of the material from the working places, either to the mouth of the level or the bottom of the shaft, and also to the raising, winding, or hoisting, as it is variously called, of that material to the surface of the ground. Great changes have taken place in underground hauling, arising from the increase in the scale with which mining is now carried on as compared with what it was formerly. Years ago the smallness of the areas worked rendered the subject one of much less consequence, and the work a comparatively easy one to get over, but when we look at the great extent of the workings now carried out in the stratified beds of ironstone, and more especially of coal, we are not surprised that all the ingenuity and skill of men of science are taxed to devise the best and most economical modes and means of underground conveyance. This portion of mining work is called *forderung* in Germany; and in the case of gold and silver, and other ores from which a small quantity of metal is extracted from a large quantity of material, the attle has to be dealt with as well. In the earlier days of mining we find by references to old writers that the orey material was carried on the shoulders of men in baskets or bags, or in masses, and it is curious that that system is lyet practised in South America and India, where mines are worked to considerable depths by no better means than climbing rocks and rude ladder-ways, which compel them to adhere to this primitive mode of conveyance, and by which they raise large masses to the surface. Up to the year 1842, when Lord Ashley's Act was passed, women and children were employed in a similar manner in some of the Scotch collieries, and continental critics gave occasionally touching descriptions of this white slavery in the centre of free Britain. This, however, is now a thing of the past, although traces of it may be found in some of the irregular deposits of iron ore in the Forest of Dean, which is carried from the working places on the backs of boys, the weight of their burdens varying from ¼ to 1 cwt. The orey material is put in a sort of wooden tray, called a "billet," to fit the shoulders, which is kept in its place with a strap round the forehead, leaving the right hand at liberty to carry a candle in a cleft stick, and they bear the burden with much less inconvenience to themselves than might be imagined. It is not uncommon to meet a line of from 20 to 30 of these boys, candle in hand, with their loads on their backs running merrily along, and vieing with each other in activity and zeal. The necessity for this arises from the peculiar character of the deposit. Suppose a level to be driven into the limestone which contains this ore, it may go some distance without finding any, and then it may come to some a little below or on one side, or, perhaps, a "churn." If there be no irregularity they sink down into it by a winze, and there is no excuse for employing boys. Sometimes it may be got by an inclined plane, made so that horses may be employed, but there are many cases in which no other mode of getting out the ore can be devised but by carrying it. In some foreign countries this old method is still adhered to, probably from the great facility with which baskets can be made, as in Spain, where esparto grass is abundant, but this is the rudest form for the conveyance of minerals. The next step is the employment of sledges or wheeled carriages. The "sled," driven along by manual force to the shaft, also seems a very rude means of conveyance. Not more than 100 years ago it was a common thing to drag sleds over the hard indurated clay floors of the levels to the exterior of the mine. These sleds are made with two runners beneath, and are still to be seen in some coal mines, where indeed, they cannot be dispensed with. Whether we take the example of post and stall or of long wall working it comes to the same thing, but the coal has to be conveyed not only along the regular roads, or by temporary or branch roads leading into them, but along small spaces at the face of the workings, where it is impossible to lay down rails or to use wagons. Sometimes when the roof is bad the space outside the props is very narrow, and the coal when it is got down is drawn on sleds to the nearest gob-road, by which it can be conveyed to the main level. In a post and stall mine the main road which communicates with the shaft is called "the engine-plane," and now-a-days the haulage along those roads is effected by steam-power. The coal being brought on sleds from the bords (generally by boys, who are called "putters") to the subsidiary ways, are mostly loaded upon wagons, and pushed along by men or boys, or drawn by horses or ponies to the engine-plane. The modes of conveyance for more than a century past have been undergoing continual improvements. In the early part of the last century the wagons were driven by hand to the bottom of the shaft; then it became more recently the practice to draw by horse-power to the main level, and put the coal on a trolley or rolley—that is, a stage on wheels, by which it is conveyed to the shaft. This is still done in many collieries. The first improvement upon sleds was the adoption of wheeled carriages, and one of the very first which came into play is still used in the German mines. It is called the *hund*, or dog, and it is found to be more useful and speedy than wheel-barrows, which are used in England more than anything else in metalliferous mines.

Wheeled wagons were first introduced into the Hartz, Hungary, Bohemia, and Saxony, in connection with wooden rails. The wagons then generally used had four wheels, one pair being near the centre, and the other pair in front. The hurryer raises the wagon off the fore wheels, and runs it on the centre pair, just as a nursemaid tilts a perambulator to overcome any trivial obstacle. By practice the hurryers run these carriages with wonderful facility and speed on the two centre wheels. In some places they put a strong pin between the wheels (a plan so old as to be referred to by Agricola), and have two wooden rails between which the pin runs, and so keeps the wagon on the proper line. When, however, we come to railways in the levels, and the carriages generally, we have to look at a great change made within the last few years; indeed, compared with the past, it may be said that a complete revolution has taken place. It used to be that the principal rolleyways were laid with rails of wood. One of those men who live before their time (Mr. John Curr, of Sheffield), almost a century ago, introduced at a colliery near that town a system like that employed at the present day. He had large flanges put upon wooden rails, and on these very large buckets, or corves, capable of containing from 4 to 6 cwts. of coal, with a strong bar of wrought-iron over each, by means of which they could be easily lifted, were placed on sleds or trolleys, with a small crane on reaching the main roadway. These buckets, or corves, are now gone out of use, although they had the advantage of being liable to a very small amount of damage, and, therefore, cost but little to repair them. On reaching the shaft these corves could be raised at once by a chain attached to the cross-bar of iron. As an improvement the coal came to be removed on a "skip," which, being stacked with some care, will hold a ton, or more, the coal being kept in its place by rings of sheet-iron. Mr. Curr then commenced and carried out a system of laying down rails of cast-iron instead of wood, and of employing tubs which might be taken into the face of the workings, and, without being changed, brought direct to the surface. Before that the coals were discharged at the foot of the shaft, and then had to be filled again into the vehicle, which was raised in the shaft by the machinery. This plan is yet in use in Belgium, and in some of our own districts, as, for instance, that of Sheffield; and, although not liable to expenses for damage, and economical in other respects, it can no longer compete with modern methods. Nowa-days the mineral is conveyed in small wagons, or, as they are called "tubs," and the system of corves has become almost universally abandoned. The tubs, which at first contained from 3 cwts. to 4 cwts. of coals, are now made to carry from 6 to 11 cwts., and there are many collieries at the present day which raise from 1000 tons to 1500 tons per diem.

With change in wagons there was also a change in the rails. The earliest were laid down in the Aldstone Moor and Newcastle districts, and the same kind may be seen in the North at the present day. In 1630 wooden rails were first introduced by a Mr. Beaumont, and they are described by M. Jars in a work upon collieries as in use in 1765, the wagons having flanged wheels. Soon after thin plates of rolled iron were laid down, to be quickly replaced by tram-plates. This great improvement, as I have said, was introduced by Mr. John Curr, of Sheffield, who laid down cast-iron tram-plates ½ inch thick. The wheels at first were very narrow at the periphery, to avoid friction. The next movement in advance was the adoption of iron rails, generally T-headed, and it is probable that very soon steel rails will become general.

The increased facility of conveyance along the underground roads rendered it necessary to quicken the work of raising the mineral; and this is now done by running the wagons into cages, which are made in two, or three, or four decks, according to circumstances. These are a few of the general pointsconnected with the gradual adoption of the system now employed—the use of T-headed rails and hard flanged tubs of very slight make, which being run on to the cages need no strength of build to sustain the drawing weight. but only sufficient to contain the material. Another important consideration is the power by which the drawing along the main roads is effected. I have already mentioned that horse-power, and in the North of England Shetland ponies, are employed in bringing the coal down to the main roads. By the use of ponies it becomes unnecessary to make the branch roads more than 4 or 5 ft. high from the putters to the trams. The use of steam-power is now general as regards the drawing along the main roads; and so they are able to do away with the use of from 50 to 100 horses, as the case may be, and save the expense of stables and all things requisite for a stud underground.

In the Northern districts of France and in Belgium, where the verticality of the seams gives rise to great irregularity of working, steam cannot alway be used. In this country, also, one or two exceptional cases may be mentioned. In South Wales and Somersetshire they use large wagons, which carry from 1 to 1½ ton, but at a slow speed. The long ton in England is 22 cwts., and in some places the so-called ton wagon is made to contain from 22 to 28 cwts. This is a very bad system, as it is unsatisfactory to the men, and leads to quarrels; and there is a general prejudice against these larger tubs, which are often found liable to accidents on the uneven roads underground, in which case there is always considerable loss of time. The question as to the cost of conveyance underground is one of great difficulty. The conditions under which the roadways of a mine are placed, their frequent sinuosity and unevenness, the confined space, and the tendency to disturbance both in the roof and floor, render it impossible to compete in economy with railways laid upon the surface. The late Mr. Nicholas Wood made a series of important experiments on the subject of traction and the conveyance underground of material. The object was to ascertain what was the maximum quantity which in a given time could be conveyed along the roads of a mine. It is important to know what can be done, and so to have a means of testing the work as to its being good or bad, Carriage forms a large item in the total expense of getting coal, and the mining engineer should, therefore, be able to estimate every item of the cost of getting the coal out, or he will but very imperfectly be able to give his employers an idea of the profits to be expected. I have said but little about the cost of getting coal. Supposing we have to deal with a certain district where the output is so much per diem, and we find that the cost of putting varies from 10d. to 3s. 6d. per ton, it is obvious that on that item alone will depend whether a profit is made or not. The first thing to be done is to bargain with the men for getting the coal away to the shaft and to the surface. In the case of some of the thin seams of coal, when rails cannot be taken past the working places and along the subsidiary road, and particularly in Somersetshire, where the men have actually to creep, the conveyance to the shed and the carriage is an expensive sort of process. It is for this reason that in small workings the cost is more in proportion than in large workings, where it is profitable to employ better systems. It is in relation to this question of conveyance that the amount of gradient becomes important. You will remember that I have told you that in starting in the main levels 1 in 200 or 300 was a good gradient; but here 1 in 100 to 1 in 200 is found better, and gives the moving power a great advantage. Mr. Nicholas Wood says that, in order to have the resistance equal in both directions, the empty tub being 3 cwts. and the loaded one 12 cwts., and the friction 1-80th of the weight, the inclination would have to be 1 in 160. Mr. Wood found that a horse dragging a carriage on a level railroad at surface will take 6½ tons for 20 miles, or 133 tons in one day 1 mile. But underground the result is very different. The inferiority of the roads themselves, their sinuosities, their deviation from the level line, are all great disadvantages; so that from 30 to 50 tons is all that they are in the habit of effecting, instead of (say) 100, which might be done. And where there were in these experiments several delays with stopping places and sidings, and when the wheels were on a smaller scale than 1 ft. in diameter, 11 to 15 tons per day was all that was achieved. In South Wales, where the work is done by large wagons, from 10 to 18 tons 1 mile was found to be the day's work of a horse. It seems, therefore, to have been an established fact that only one-tenth of what ought to be done at the surface is frequently all that is got from horse-power underground, increasing when better roads are kept up to about one-fifth. The obvious want of economy in the employment of horse-power led to the more general adoption of engine-power and rope-traction. In metalliferous mines wagons and railways are employed in all the principal levels; but in the subsidiary processes and at the face of the workings wheelbarrows are used.

[The lecturer concluded by showing models of wagons of divers construction, many of them having ingenious arrangements for a rapid discharge of the contents either at the end or sides or bottom, or by tilting.]

## THE INSTITUTION OF CIVIL ENGINEERS.

The Council of the Institution of Civil Engineers have just awarded the following Premiums for Papers read at the meetings during the Sessions 1871-72:—

1. A. Telford Medal, and a Telford Premium, in Books, to BRADFORD LESLIE, M. Inst. C.E., for his "Account of the Bridge over the Goral River on the Goalundo Extension of the Eastern Bengal Railway."
2. A Telford Medal, and a Telford Premium, in Books, to CARL SIEMENS, M. Inst. C.E., for his Paper "On Pneumatic Despatch Tubes: the Circuit System."
3. A Telford Medal, and a Telford Premium, in Books, to WILLIAM BELL, M. Inst. C.E., for his Paper "On the Stresses of Rigid Arches, Continuous Beams, and Curved Structnres."
4. A Telford Medal, and a Telford Premium, in Books, to JOHN HERBERT LATHAM, M. Inst. C.E., for his description of "The Soonkesala Canal of the Madras Irrigation and Canal Company."
5. A Telford Medal, and a Telford Premium, in Books, to GEORGE GORDON, M. Inst. C.E., for his Paper "On the Value of Water, and its Storage and Distribution in Southern India."
6. A Telford Premium, in Books, to FREDERICK AUGUSTUS ABEL, F.R.S., for his Paper "On Explosive Agents applied to Industrial Purposes."
7. A. Telford Premium, in Books, to BASHLEY BRITTEN, for his Paper "On the Construction of Heavy Artillery, with reference to Economy of the Mechanical Forces engaged."
8. The Manby Premium, in Books, to CHARLES ANDREWS, M. Inst. C.E., for his Paper "On the Somerset Dock at Malta."

The Council have likewise awarded the following prizes to students of the Institution:—

1. A Miller Prize to OSWALD BROWN, Stud. Inst. C.E., for his Paper "On Sewage Utilization."
2. A Miller Prize to ARTHUR TURNOUR ATCHISON, B.A., Stud. Inst. C.E., for his Paper "On Railway Bridges of Great Span."
3. A Miller Prize to JOHN ADDY, Stud. Inst. C.E., for his Paper "On the most suitable Materials for, and the best mode of Formation of, the Surfaces of the Streets of large Towns."
4. A Miller Prize to ALFRED EDWARD PRESTON, Stud. Inst. C.E., for his Paper "On Wood-Working Machinery."
5. A Miller Prize to WILLIAM PATTERSON ORCHARD, B.E., Stud. Inst. C.E., for his Paper "On the Education of a Civil Engineer."

## THE SOUTH MIDLAND INSTITUTE OF MINING, CIVIL, AND MECHANICAL ENGINEERS.

The first meeting of the South Midland Institute of Mining, Civil, and Mechanical Engineers since the election as President of Mr. Edward Jones, F.G.S., mining engineer of the Lilleshall Company, was held at the rooms of the Institute, Wolverhampton, on Monday. The President elect was in the chair, and he was supported by Mr. T. Rose, Mr. Green (Shropshire), Mr. B. P. Walker, Mr. Bromley, Mr. Watkins, Mr. Beach (Shropshire), Mr. Underwood, Mr. Griffiths, Mr. Blakemore, Mr. Ness, Mr. Fereday (Shropshire), Mr. Tolly, Mr. Nailor, Mr. Meacham, Mr. D. W. Lees (secretary), and others. A splendid section of the Shropshire sinkings of the Lilleshall Company, that had been so successfully conducted by Mr. Jones, was hung in the room. It had been specially prepared at considerable cost as a gift to the Institute by the new President, and it occupies a permanent and prominent position amongst the archives of the Institute. The section will form a valuable work of reference in all geological researches connected with the unexplored portions of the much-debated Shropshire coal field. The minutes of previous council meetings and those of the annual meeting were confirmed. One of the former dwelt upon the legality of Mr. Jones's election, and expressed the gratification of the council that the Institute was now to be so ably generalled. These sentiments were echoed by Mr. Rose, who as a Vice-President temporarily occupied the chair during the early preliminary proceedings. The President testified to his appreciation of the favour with which they regarded him, and promised to do his best for the Institute. They might also look with confidence for similar hearty support from his Shropshire friends, who from time to time would be prepared to read papers. Five new members were nominated, and the secretary announced that members had promised papers that would afford interesting and valuable materials for debate throughout several successive meetings. It seemed to be considered that much and varied information relative to mining and mechanical engineering would henceforth result from the meetings of the South Midland Institute of interest, not to the district alone but to the country generally.

The PRESIDENT said that his duties did not leave him time to comply with the request of the secretary, and prepare what it had been usual to describe as "an inaugural address," but he would off-hand give them the result of recent personally conducted researches and practical observations in relation to coal mining, as well remote from as near to their own localities. In some observations of his, made not many days ago, he was reported to have promised to give the Institute the result of certain investigations made with and for the Duke of Sutherland, on the ancient estate of Scotland from which His Grace took his title. Let him now say that in Sutherland, where he had expected to find granite, with scoria, and other traces of igneous action, he had found coal—coal that he believed would prove of great value, that would have the carboniferous ironstone associated with it, would be found lying immediately beneath the oolite, which was the formation at the surface, and that would prove to be of a larger area than any other known coal field in Scotland. He had traced the coal from the River Brora to the Frith of Dornoch, and upwards along the eastern edge of Sutherland to Helmsdale. Simply as the friend of the Duke of Sutherland, he was having powerful machinery made for conducting the sinkings. This would soon be be laid down, and its use would be wholly under his direction. Operations were even now being conducted, and he would keep the Institute duly informed of the progress of the work; which would have an important bearing upon the question of the existence of coal between London and Dover. The President showed fossil specimens of the oolite formation that he had brought from the quarry of which Dunrobin Castle, the Scotch baronial seat of the Duke of Sutherland, was built, and is still being enlarged, and beneath which Mr. Jones believes the coal is lying.

The President afterwards went on to speak of the Shropshire coal field. His views are by no means so encouraging as to the probable endurance of coal in that county as are those entertained by Professor Ramsay, Mr. Henry Beckett, and other eminent geologists. He asserts, with much confidence, as the result of his actual working experience and close observation, extending over some forty years, that the coal of Shropshire is being rapidly worked out. No coal, he says, will be found between the great eastern fault and the edge of the Staffordshire field, near Wolverhampton. (The eastern fault is near to Shiffnal.) Nor will there be any coal found between the other side of that fault and the Wrekin; and if coal should be pierced at Child's Ercal (for it has not yet been found there, though 1000 feet have been gone through) it will, in his opinion, be merely the feathered edge of the North Staffordshire coal field. In proof of his conviction that Shropshire will not yield what is required by the ironmasters and others there, the President stated that, on behalf of the Lilleshall Company, he had just purchased, and was now beginning to work, a mineral tract in North Wales, and that a similar course was being pursued by the Coalbrookdale Company. However, the question would be further debated by the Institute. The question would come up again at the next meeting, when Mr. Daniel Jones, F.G.S., had consented to read a paper on the Correlation of the Shropshire and the Staffordshire Fields. Upon some other occasion, he should be able to state the result of his inspection of the sinkings at Child's Ercal, which he had promised to visit in company with Mr. Etheridge, of the Museum of Mines, London. But he was afraid that coal mining in Shropshire would soon be reduced to a cheese-paring affair.

When the President had given the result of his experience as to the produce per acre in the different coal fields of Great Britain, and Mr. Bromley had shown how the suggestions of the Institute had been accepted by Parliament in those portions of the Coal Mines Regulation Bill already adopted, the meeting, which was one of the most important that has yet been held, terminated with the usual compliment to the chair.

BOLCKOW, VAUGHAN AND CO.'S MIDDLESBOROUGH WORKS.—Though the works of Messrs. Bolckow and Vaughan are not the oldest in Middlesborough, yet their extent, and the colossal properties in mines and mills owned by the company, give them undoubtedly the first position among the industries of our immense hive at the mouth of the Tees. The works at Middlesborough alone cover from 21 to 24 acres, comprising rolling-mills, three blast-furnaces, and about 70 puddling-furnaces. They are situated between Vulcan-street and the River Tees, on which they have a frontage of above 600 yards, with wharves and five steam-cranes. They employ at present some 1600 or 1700 hands in the blast-furnaces, rolling-mills, foundries, fitting-shops, &c., some two-thirds of whom are paid by the week, and the remainder by contract. There are two rail mills and seven steam-hammers. Some notion of the colossal extent of the general operations may be formed from the fact that the company now employs from 10,000 to 11,000 men; that it has iron mines and works at Eston, Eston Junction, Wilton, Skelton, Guisborough, and Wilton Park; steel works near Manchester; from 10 to 12 collieries, including those at Whitelee, Shildon, West Lodge, Woodifield, West Auckland, and the "Black Boy" Collieries; it farms thousands of acres; owns four steamers, two of which ply between its mines in Spain and Middlesborough; it owns and leases many hundred of houses for its colliers and miners; and that it manufactures at Middlesborough its own gas, makes its own fire-bricks, and, in addition to making and fitting the machinery, boilers, and engineering tools for its works at various parts, builds also its own wagons. Of the amount of coal and iron raised we can give here no idea, beyond the figures already stated; but these are enormous. Of coke, at a recent date, the company consumed above 250,000 tons yearly, with 150,000 tons of limestone.—*South Durham and Cleveland Mercury.*

## FOREIGN MINING AND METALLURGY.

The ironworks of the North of France are every day receiving orders which assure them employment for some time in advance, so that prices are maintained with increasing firmness. Rolled iron is quoted at 11*l.* 4s. to 11*l.* 8s. per ton; mixed coke-made iron at 12*l.* to 12*l.* 8s. per ton; and charcoal-made ditto at 12*l.* 8s. to 13*l.* 4s. per ton. Rough axles fluctuate between 12*l.* 16s. and 13*l.* 4s. per ton, while turned axles are selling at from 17*l.* 12s. to 18*l.* per ton. In the Ardennes, MM. Mineur and Vireux are about to light a second blast-furnace; with this second furnace lighted they will be in a position to produce about 100 tons of refining pig per day. According to the arrangements of the French budget for 1872, the credits placed at the disposal of the Minister of the Marine will enable him to build in the State arsenals 14 ships of war of various classes and sizes, two armour-plated ships of the first rank, an armour-plated ship of the second rank, and two armour-plated monitors. The remaining nine vessels will be made up of frigates, avisos, gun-boats, and steam-transports. The Biache-Saint-Vaast Foundries and Rolling Mills Company will pay July 1 the balance of its dividend for 1871–2, or 4*l.* 16s. per share.

Belgian industrials propose to secure a worthy represention of Belgian metallurgical industry at Vienna. Thus several Belgian forgemasters have assembled at the Ministry of the Interior in order to arrange for a collective exhibition of their products. They decided to share among them the cost of exhibiting their entries, and the decoration of the compartment allotted to them. At the last adjudication of rails for the Belgian State Railways the price of steel rails was established, as follows:—Sclessin Company, 13*l.* 10s. 8d. per ton (Siemens); and Cockerill Company, 14*l.* 11s. 5d. per ton (Bessemer). We find that the report of the Charleroi Chamber of Commerce, which has just been published, remarks that the past year was a bad one for rail contracts, notwithstanding the exceptional favour enjoyed by metallurgical products. Thus, while in 1869 Belgium exported 136,185 tons of rails, and 124,529 tons, in 1870, the exports in 1871 only amounted to 81,970 tons. The exaggerated prices demanded by some Belgian manufacturers coupled with the inferior quality of the rails delivered, contributed probably a good deal to the unfortunate results observed last year. It is especially with Russia that the Belgian rail-producing interest has lost ground. Thus while Belgian rails were exported to Russia to the extent of 67,419 tons in 1869, and to the extent of 54,338 tons in 1870, the exports declined to only 5195 tons in 1871. In the course of last year there were 27 blast-furnaces in activity in the arrondissement of Charleroi, while there were 14 out of blast. The number of workmen employed was 2312; and the quantity of casting pig produced was 31,520 tons, and of refining pig 327,600 ions. The same district had 42 foundries in operation last year, 20 rolling-mills, and 21 establishments for working iron. The production of iron last year in the Charleroi group was 240,702 tons. The La Haye Colleries Company will pay, July 1, a first dividend for 1871-2, or 1*l.* per share.

The report of the Charleroi Chamber of Commerce states that that important mining district produced last year 3,687,500 tons of coal, as compared with 3,766,558 tons in 1870. The number of collieries in activity in the Charleroi district last year was 54, employing 174 extraction engines, representing a force of 16,073-horse power. The number of workpeople employed in the interior of the workings was 26,230; those employed above ground were 9483, making a total of 35,713. These details refer to the mining arrondissement of Charleroi; the quantity of coal extracted last year in the whole Charleroi basin was 5,566,500 tons. It is estimated that a new law forbidding the employment of children in mines will deprive the Charleroi coal-mining interest of 7000 young workers. Upon the whole, 1871 would have been a good year for the Charleroi coal trade had not a great scarcity of railway rolling-stock hindered business operations.

Coal remains in France at the high rates hitherto current, and it is expected that these prices will continue for some time to come. A decree, prescribing the definitive route of a railway from Lerouville to the Ardennes lines, has at last appeared. This line, which was conceded some years since, is of very great importance for the Haute-Marne basin, which will derive much benefit from its construction. The Belgian coal trade continues to display very great activity; deliveries, especially by water, have acquired recently considerable importance. Prices remain firm, but do not exhibit any sensible advance, notwithstanding the exhaustion of stocks, the scarcity of labour, and the increase in the demand which seems likely to accrue from strikes in the basin of the Ruhr. Freights from Charleroi to Paris remain at 8s. per ton. A great demand for Belgian coal is anticipated in the winter months, and there are some apprehensions that rolling-stock will again make default on the local railways. An advance in coke is spoken of as probable, but it has not yet actually taken place. The Herve Wergifosse Collieries Company paid, July 1, a dividend for 1871 of 1*l.* 16s. per shares. The Valbenoit Collieries Company paid, July 1, a dividend for 1871-2 of 8s. per share. The Sclessin Blast-Furnace's, Ironworks, and Collieries Company paid, July 1, interest for 1871-2 at the rate of 13s per share.

Coke-made pig commands a quotation of 4*l.* 16s. per ton in France, while iron has realised 12*l.* per ton. The prices of last week have hardened, and have exhibited an upward tendency; there do not appear, indeed, to be any apprehensions of a fall at present in quotations. The demand for iron continues strong, and the advance in prices proceeds from purchases, there being a great many necessary works to provide for. At the same time, there is no doubt that all works which are of a less urgent character will be postponed to a more propitious period. The French forgemasters do not conceal their hopes: they have tolerably good reasons for believing that the advance in prices has not yet attained its apogee, and that when a decline sets in it will be very slow and gradual. The French iron trade is anticipating considerable orders from America, from which England will not alone be enabled to profit, as hitherto. The sole black spot in the situation is the reaction which may possibly take place in the markets of other countries—a reaction which would soon make its influence felt in France; some apprehensions are also entertained as to the results which may follow the "denunciation" by France of the treaties of commerce concluded by her some years since, What is needed before everything else in France is the maintenance of the *status quo*, which is very favourable for industry after the sufferings through which it has recently passed. A report by M. Krantz on internal navigations has been distributed to the members of the French National Assembly. M. Krantz declares himself opposed to a suppression of dues on canals. A strike at the Seyne Works has terminated without any concessions having been made to the workmen.

The Châtillon and Commentry Ironworks Company, although sorely tried in the first half of last year, realised in 1871 a profit of 37,612*l.* A dividend was declared at the rate of 1*l.* 4s. per share, a sum of 1500*l.* was devoted to the reserve, and a balance of 6111*l.* was carried forward to the credit of 1872. The profit of 1871 exceeded that of 187[illegible] by 10,940*l.* As regards the current year, it may be said to have proceeded thus far upon the most favourable conditions. A metallurgical company has just been established at Piombino, Italy. The company has acquired the establishments bearing the name of Perseveranza. The share capital has been fixed at 60,000*l.*, divided into shares of 20*l.* each. It may be added that 2000 shares are reserved to the promoters; the remainder are issued at 21*l.* 12s. each and are to bear an interest of 6 per cent. per annum. The house of Wendel, or rather the Hayange Company, has obtained a contract for rails for the Werra Railway at 12*l.* per ton. Strikes which have occurred at Essen are considered to be in a fair way of adjustment, there has been no breach of public order.

A fall of 2*l.* per ton has occurred at Paris in Chilian copper in bars delivered at Havre; transactions are reported at 110*l.* per ton; Chili ingots, at 114*l.* per ton, also show a fall of 2*l.* per ton. Tough English is quoted at 115*l.* per ton, and Corocoro minerals, pure standard, have brought 112*l.* per ton. At Havre a transaction is noted in 60 tons

of Chilian bars, at 112*l.* per ton, Paris conditions. At Marseilles copper has been firm; Spanish has made 98*l.*, and small refined ingots 106*l.* per ton. The advices received from the German copper markets are tolerably satisfactory; transactions are regular, and quotations are firm. At Paris, Banca tin, delivered either at Havre or Paris, has made 168*l.* per ton, showing a slight advance; and Straits, 163*l.* 6s. per ton, a quotation which also exhibits an upward tendency in prices. The price of English tin has not varied in Paris; it remains at about 160*l.* The German tin markets have been firm. At Rotterdam, also, prices have been well supported; some transactions have taken place in Banca, at 94 fls. to 94½ fls.; disposable Billiton has brought 92 fls. to 92½ fls. In both Germany and France there has been scarcely any variation in lead. There is no change to note in zinc upon the French markets; Silesian and other good marks realise 22*l.* 16s. per ton.

The advance recently indicated in plates in Belgium has become general; No. 2 has made 14*l.*, and No. 3 14*l.* 16s. per ton. Prices of other descriptions of iron remain firm, and the general activity of the Belgian markets has not slackened. At the same time, several transactions are stated to have been concluded below current quotations. Thus, rails, although generally quoted at 10*l.* 8s. per ton, may be obtained in small lots at 10*l.* to 10*l.* 4s. per ton, upon the condition that the period of guarantee is reduced. The last number of the *Revue Industrielle des Mines et de la Metallurgie*, published under the direction of M. de Cuyper, contains a somewhat remarkable treatise by M. Philippart, on Mechanical Puddling by the Danks process. The treatise or report of M. Philippart is very complete from a descriptive, mechanical, chemical, and financial point of view. M. Victor Tahon, one of the engineers deputed by the forgemasters of Belgium to examine the Danks process in England, has also delivered a report. M. Tahon endorses the views generally current in England upon the subject; and, assuming that Belgium produces annually about 700,000 tons of iron, he calculates that the Danks system will, if generally adopted, realise a saving of from 280,000*l.* to 320,000*l.* per annum. On May 8 the Administration of the Belgian State Railways invited tenders for rails, with fish-plates, bolts, &c.; and the lowest tender was that of M. Boucquéau, of La Louvière, who required 10*l.* 19s. 7d. per ton. These terms were considered too high, and on June 27 a re-adjudication took place, at which the lowest tender was that of the Marcinelle and Couillet Company, which stood out for 12*l.* 12s. per ton. At this rate rails and accessories would appear to have advanced in six weeks to the extent of 1*l.* 12s. 5d. per ton; altogether, it is rather a ludicrous business.

## THE MINERAL RESOURCES OF SPAIN.

### ZINC AND ZINC ORES.

The early history of zinc is involved in much mystery, for whilst there is frequent reference in the ancient writers to an alloy which from the description given of it cannot well be supposed to be anything else than an alloy of copper and zinc (a supposition which seems partially justified by the name given to it—orichalcum, or mountain copper), it is difficult to imagine that the "false silver," which it was considered existed in combination with the copper, could have been obtained by the process described for its production. At present zinc, or as it is more commonly called spelter, is in very common use for industrial purposes, and the chief recognised sources of supply are Silesia and Belgium, the larger proportion of ores for the manufacture of the latter quality being derived from the Altenberg mines. It may fairly be questioned, however, whether modern Europe was not originally indebted to Spain and Portugal for the metal, since we are told that in the earlier part of the seventeenth century the Dutch captured a Portuguese ship with a cargo of zinc, which they sold under the name of speauter; and although this cargo was considered to have been brought from the East by the Portuguese, the evidence in favour of that supposition is not very strong, and it is not less reasonable to suppose that it was produced either in Spain or Portugal. Indeed, the evidence of zinc coming from the East at all is very weak, for even Dr. Percy, who is regarded by many as a very competent metallurgist, confuses *tutenag* and zinc; for he says that "during the last century zinc was largely imported into Europe under the name of *tutenag*, it is said, from the East Indies." Now, everyone connected with commerce knows full well that it would be no more possible to sell zinc in any European market for tutenag than it would be to sell prime wood for mahogany. Tutenag, as we all know, consists of about 46 per cent. of copper, 17 per cent. of nickel, and 37 per cent. of zinc, so that even Dr. Percy would not be likely to mistake it for zinc; yet this is, perhaps, the strongest evidence offered of zinc coming from the East.

That the Chinese have long understood the mode of manufacture is not questioned, but it is thought that there is insufficient evidence of zinc having been imported from any part of the East, and this leaves it open to suppose that Spain and Portugal were originally the source of supply for zinc, as it is well known to have been the source of supply for lead. The recent discovery of "gigantic deposits of massive calamine in the Peñas de Europa mountains" to some extent justifies this opinion; for it is observed, with truth, that in the earlier periods of civilisation the richest and more readily worked deposits of minerals always receive first attention. To develope the discovery above referred to and which is comprised in the concession called Bien Venido, the SPANISH ZINC COMPANY have issued a prospectus, which will be found in another column of this day's Journal, inviting subscriptions for 50,000*l.* FIFTEEN PER CENT. FIRST MORTGAGE DEBENTURE BONDS, the proceeds of which are to be applied, firstly, to the payment of the cash portion (30,000*l.*) of the purchase price, the remaining 20,000*l.* being taken in shares; and, secondly, for providing 5000*l.* floating capital, which it is considered will be ample. This will leave 15,000*l.* for tramway and jetty, which are required for the successful development of the property. The mines have been carefully inspected and reported upon by Mr. Tait Brindley, C.E., late mineral surveyor to Earl Granville and Messrs. Liscombe and Co., of Liverpool, have undertaken the issue of the bonds; it is arranged that with each debenture bond paid-up shares of equal nominal value will be allotted to the bondholder by way of bonus, which it is shown will give them beyond their first charge on the property a full five-sevenths of the mines and assets of the company.

The numerous mineral lodes traversing the concession—one of which, the Madre lode, is described as being among the most remarkable ever discovered—have been from time to time worked on the surface and by shallow galleries by the native peasantry in search of lead, of which small deposits occur among the calamine; but these peasant miners, being ignorant of the nature of calamine (which has no metallic appearance), regarded it merely as a heavy and worthless spar, so that the real value of this gigantic calamine deposit, although its existence was obvious to any passer-by, has only been recently discovered—indeed, its full value has only been thoroughly ascertained since the negociations for the purchase of the property by this company have been completed, otherwise it could not possibly have been placed before the public on the present moderate terms. The most remarkable point about the mine seems to be that there lies open to the day on the surface of the mountain sufficient calamine to last for 20 years, at the rate of production of 1000 tons a month. Mr. Brindley's estimate of the quantity of calamine available, without opening out new ground, is at least 250,000 tons. The most extraordinary opinion is entertained in the neighbourhood of the enormous quantities that are to be obtained from this concession, for even the engineers over there own to calculations bringing the amount to upwards of 1,000,000 tons. However this may be, and taking a minimum view of everything, it is well ascertained that both the quantity and quality of the calamine are unsurpassed by any similar deposit in Europe. With regard to the quality of the ore, the analyses of Mr. Martin Murphy, F.C.S., principal of the Liverpool College of Chemistry, are as satisfactory as could be desired. They give 52 per cent. of metallic zinc, combined with 12½ per cent. of oxygen, and the entire remainder of the ore, with the exception of ¼ per cent. of oxide of iron, is carbonic acid, so that the mineral appears to be practically pure carbonate of zinc. He estimates that metal could be produced from it at 16*l.* 12s. per ton, so that, with the present prices of 22*l.* for spelter, there would be no reason to complain of the profits realisable. The prospects are altogether very encouraging.

NEW QUICKSILVER ASSAY.—The following description of a new method of assaying quicksilver ores, by A. Eschka, is taken from the *Berg-und hüttenmännische Zeitung*. The new assay may be used for cinnabar, mercuriferous Fahlerz, &c. The ore should be weighed in a balance turning with one milligramme. The quantity of ore for the assay varies according to its richness as follows:—

| | | |
|---|---|---|
| Ore containing up to | 1 per cent. | 10 grammes. |
| ,, | 1 to 10 ,, | 5 ,, |
| ,, | 10 to 30 ,, | 2 ,, |
| ,, | over 30 ,, | 1 ,, |

The ore is introduced into a porcelain crucible, the edge of which has been ground flat, and mixed with about half its weight of clean iron filings, by means of a glass rod, and is then evenly covered with a layer of iron filings, about ¼ to ⅜ inch thick. A concave cover, made of fine gold, about 2 in. in diameter, and 12 to 15 grammes in weight, is now placed on the crucible after having been carefully weighed: the concavity is filled with distilled water, and the crucible placed on a triangle, and heated for 10 minutes by a Bunsen burner or Argand spirit lamp, during which time the mercury is volatilised and deposits itself on the gold. The gold cover is then removed, the water poured off, and the mirror of mercury on the convex side washed with alcohol from a wash-bottle. After being dried in the water bath the cover is allowed to cool thoroughly, and is then weighed in a balance turning with half milligramme, with 50 grammes in the pan. The increase of weight gives the quantity of quicksilver in the ore. During the weighing the cover is placed on an empty porcelain crucible. The quicksilver is then driven off by heating the cover gently in the flame of a Bunsen burner or a spirit lamp, in a place where there is a good draught, and the empty crucibles and cover are subjected to a second weighing as a check. In order that the assay should succeed the following conditions must be fulfilled:—The cover must fit closely, so as to avoid loss of quicksilver, and must be deep enough to hold a sufficient quantity of water to keep it cool. The iron filings must be free from grease, which would prevent the proper formation of the mirror; the washing with alcohol must not be omitted, as it removes all the bituminous substances which spoil the mirror, and assist the drying; drying in a water bath for two or three minutes; cooling in the exsiccator; weighing when fully cool. When assaying rich ores the alcohol used in washing the cover must be collected, as it may contain a little amalgam; it must be poured into the concavity of the cover, which will take up any little globules of quicksilver. The most exact results are obtained in the case of poor ores containing less than 10 per cent.

GOLD MINING ON THE ORINOCO.—The Governor of Guayana, writing in "Thompson's Investment Circular," says—"The Baron Von Humboldt, in passing down the Orinoco on his famous voyage, never left the basin or delta by the river. Naturally his attention was drawn to the immense outcrop of granite rocks all the way from the Cataract of Atures and Maypures down to Angostura or Ciudad-Bolivar, the lowest point on the river reached during his travels, and as naturally his impressions were opposed to the idea of any extensive deposits of gold bearing found in such formation. At that time the missions of the Caroni were sealed to all external influences; travel through them was almost interdicted by the Capuchino fathers, and the general policy of Spain was not only entirely opposed to the introduction of foreigners, but also equally adverse to any provincial schemes for the development of the material wealth of its colonial dependencies. It was not until the independence from the Mother Country, in 1812, that free intercourse throughout the Republic, and entire freedom for the enterprise of its inhabitants, led to the gradual opening and settlement of the valley of the Caroni, and some development of its natural wealth by agricultural and pastoral pursuits. The Mission Stations of the Capuchino had mostly disappeared, and settlements were generally concentrated near the Old Missions of Caroni, Upata, Tumeraono, and Miamo. Tupequem, near the banks of the Yuruari river, was almost entirely in ruins, when in 1853 the first gold washings were discovered in the Yuruari. The news spread rapidly, and thousands sought the El Dorado; but they came into an entirely wild country, with no provisions for their shelter or support; their labour was in the river under a terrible sun, they slept in hammocks under the trees, exposed to the miasma of a river bottom, their food was poor in quality and irregular in supply, and under all these influences naturally malignant fevers raged, and death soon reaped its harvest from their ranks. Men fled from the workings as from a pestilence, and the road back to Orinoco was lined with the sick and dying. Thus the first fever for gold died away, and for years the place was almost unvisited. In 1857, however, gold was found in the quartz veins south of the Yuruari of great richness and immense extent. Public attention was again drawn to it, and a gradual but steady deve opment ensued. The town of Caratal, or Nuera Providencia, was established about six miles south of the river, and its population slowly augmented, until in 1865 it contained about 2500 souls, with many stores and considerable stocks of merchandise. Much of the country about it was cleared and planted, sun-light and ventilation improved the sanitary condition of the place, and, upon the further discovery of veins of unusual richness in 1866, its population sprang up to 6000 in 1867, and is now increasing week by week. All classes and races meet here in the pursuit of gold; Venezuelans, Negroes from the different West India Islands, Frenchmen from Cayenne and Martinique, run-away sailors of all nationalities, Americans, Chinamen, and Indians.

Seven well-defined veins of quartz rock cross the country, with a general direction of north-east and south-west, the most narrow being 28 in. wide, the widest 46 in. From this latter, known as the Chili vein, immense treasures have been taken; it has been uncovered for about 800 yards, with increasing richness at every advance, its yield being from $300 up to $127,000 per ton of quartz. The enclosing rocks are highly metamorphosed chloritic and talcose slates, with the quartz veins constantly outcropping, often almost entirely decomposed, and yielding great returns with but a slight expenditure of labour. At points along the Yuruari river are considerable upheavals of granite, and all over the Savannahs to the north are veins of quartz, often largely impregnated with gold. These can frequently be traced for many miles by outcrop, and extend with few interruptions almost to the Orinoco river. This same deposit of gold reaches from the Yuruari river to the Ventuari, one of the upper tributaries of the Orinoco, a distance of over 400 miles. It is unquestionably the 'El Dorado, sought by the early Spaniards and by Sir Walter Raleigh—not the dream of the Madre-del-Oro,' nor the great centre in which they believed, but of a richness and extent far beyond their wildest dreams, and destined to effect an influence upon the world at large more extended than the opening of California and Australia combined. Nearer the Orinoco, and throughout the range of mountains meeting the river near Vieja, Guayana, and from thence running south-westerly, are immense deposits of iron, frequently in great masses of rich percentage, and the rocky beds of all the mountain streams are coated a glossy black by the oxides held in solution in their waters. Mines of silver and copper have been discovered, but remain undeveloped, owing to the greater attractions presented by the auriferous deposits, and from Caicara to Tripaguem deposits of pure mercury have been found, held in the clays along many of the streams. United to these resources the district enjoys peculiar advantages in its political relations. Its position south of the Orinoco isolates it to a great extent from the other portions of the Republic. Its people are quiet and prosperous, its Government staple and efficient, and from the date of its independence from Spain in 1812, it has remained undisturbed by the political contentions and revolutions which have proved so disastrous to many of the Federated States. Under such circumstances its eventual power and prosperity and position in the Federation is abundantly secured."

THE COAL IN NOVA SCOTIA.—Mr. R. Ashmore Powell writes:—"Whilst at Cape Breton, last month, I visited the Schooner Pond Mine, which produces some of the best coal in Cape Breton, and for gas purposes it is superior to the Old Sydney Mines; it is, moreover, considered superior to the best West Hartley in England; being free from bituminous matter and sulphur, it is firmer and will prove, for steamship purposes, more durable. The want of everything like a harbour or land carriage for the coal has hitherto rendered the mine almost useless. The former proprietors shipped a few cargoes in scows, but sailing ships feared to anchor in such a wild neighbourhood. The wharf was soon washed away, and the work ceased. A slope had been driven to the Ross seam, coal had been taken, and there is now perhaps 1500 tons at bank; the sides of the cutting have, however, fallen in, and the work abandoned. A tunnel was also driven where the seam crops out on the cliff, and from this opening coal was got down and shipped at the wharf; there was, however, scarcely sufficient sent to market to establish its reputation. The present company commenced working by extending the tunnel a few fathoms. A shaft was sunk 24 ft., which dropped upon the tunnel, and coal was taken out. A slope is being driven towards the shaft, and when sufficiently down the mine will be opened right and left. The old tunnel will prove of much service in draining off the surface water. The machinery you were so fortunate to obtain at Halifax is by this time at Schooner Pond; a saving of several months' time and nearly 50 per cent. in cost has been made by this purchase in the country. The property has great capabilities for supplying coal, and it is a good sign that cannel coal has been found, although in small quantities, to crop out on the surface."

MINERAL WEALTH OF THE PACIFIC COAST.—An extensive strike of lead is announced in the Union Mine, Cerro Gordo. The Waucoba district mines are of the same general character as those of Cerro Gordo, with great numbers of lead and silver lodes, and are supposed to be upon the same mineral belt. The Calaveras *Chronicle*, June 1, says—"5 tons of rock taken from the mine of Herryhausen and Co., at Mosquito Gulch, gave an average of $160 per ton. The quartz from the Zacetera Mine, at West Point, is yielding an average of $70 per ton. The most favourable developments continue to be made in the Zacetera. The Manoney Mine, near Sutter, Amador County, is producing exceedingly rich rock, and never since the mine was opened has the prospect looked brighter. In Nevada County the Erie Mine is turning out splendid rock. The Amshaw Mine, near the Erie, has a fine looking lode. The old Scotchman's tunnel cement diggings are to be opened up immediately. The Black and Young is taking out better rock than ever before. This mine is declaring a dividend every month. All the gravel diggings are being worked very extensively." The Gilroy *Advocate* has the following:—"The Stayton Quicksilver Mine, situated about 30 miles south-east from Gilroy, on Los Banos Creek, Fresno County, promises to be one of the very richest on this coast; 5 lbs. of the cinnabar, imperfectly assayed, yielded 2 lbs. 4 ozs. of pure quicksilver. The Poncho Claim, just below Hawkinsville, and Siskiyou County, four men engaged produced $1,140·38. Another claim in the same vicinity is expected to realise between $7000 and $8000 when their clean-up is finished. The marvellous richness of the Cederberg Quartz Mine, Placer County, is attracting the attention of mine owners and capitalists. The great advance in the price of copper and the increasing demand for metals are stirring up the owners of copper lodes in Nevada County, which have been lying idle for some years, and companies are making preparations to resume work. Specimens of copper ore taken from a lode on Deer Creek show 75 per cent. of virgin copper. A Frenchman, named J. B. Bordes, last week found a lode of quartz in Tuolumne County, which prospects at the rate of $2000 per ton.',

NORTHERN PACIFIC RAILROAD.—Trains are running from Duluth to Fargo on Red River 255 miles, and work is now being pushed on 200 miles more, the company expecting to complete 260 miles to the Missouri River during this year. The route through Montana has been filed, and the Commissioner of the General Land Grant Office has accordingly ordered the land to be withdrawn from the market. The road enters the territory at or near the intersection of the 47th parallel with the eastern boundary, thence south-easterly, following the Yellow Stone River to the Bozeman divide, over which it passes; thence north of the Bozeman City and Hamilton down to Gallatin, crossing the Gallatin River at Gallatin City; thence up the Jefferson River to Big Hole, and following that stream for a short distance; thence through the Deer Lodge Pass; thence down the Deer Lodge, Hell Gate, and Missouri Rivers; thence south-westerly, leaving the territory on the north side of Clark's Fork of the Columbia, about 12 or 15 miles north of the intersection of the 48th parallel with the boundary of the territory. On the western end of the road a section of 25 miles is in operation, and 40 miles under construction, which will be completed this summer. This will connect the Columbia River at Kalama with Puget Sound.—*New York Financial Chronicle.*

# Meetings of Mining Companies.

## EL DORADO GOLD MINING COMPANY OF NOVA SCOTIA.

The first annual general meeting of shareholders was held on Friday, June 28, at the offices of the company, 445, West Strand,

Mr. H. L. NICHOLLS in the chair.

Mr. W. MORRIS (the secretary) read the notice convening the meeting.——The CHAIRMAN, in moving the adoption of the report and balance-sheet, said—

The directors beg to lay the first report of the El Dorado Gold Mining Company before the shareholders. The accounts, made up to May 31, include ten months' work, and when the difficulties which have been encountered are considered, trust that the result will meet with the approbation of the shareholders. Shortly after obtaining possession of the property the mining captain gave notice to leave; a new manager had to be sent out, and the way in which he has commenced operations gives every reason to hope for the future success of the company. Capt. Powell, one of the directors, immediately on the retirement of the manager, undertook to go out and look after the property, and the thanks of the company are due to him for the able supervision he has given to all new arrangements. He reports most favourably of the undertaking, and has every hope that the mine will prove to be very remunerative. After deducting every charge connected with the new machinery required, and the unavoidable expense which was necessitated by the appointment of a new manager, there remains a balance of 157*l.* 8s. 3d.; and the directors consider themselves justified in declaring a dividend of 5 per cent. on the capital paid-up, which will absorb 116*l.*, leaving 153*l.* 7s. 7d. to be carried forward to the next account. The directors would suggest that the shares not yet placed (say, 148) should be offered as opportunity arises, and the amount realised held as the nucleus of a reserve fund. Every attention has been paid to the economical working of the mine; and, although all mining is attended with risks, believes that the property is very promising, and likely to give very good returns.

## WHEAL JEWELL MINING COMPANY.

A general meeting of shareholders was held at the account-house, on the mine, on Wednesday,—Mr. WILLIAM GUNDRY in the chair.

Mr. THOMAS PRYOR (the purser) read the notice convening the meeting, and the statement of accounts to end of May, which showed a debit balance of 375*l.* 8s. 11d.; these were unanimously passed, and a call of 60*l.* (1s. per share) was made. The report of the agent was of a highly encouraging character. The meeting was attended by several gentlemen from London, who expressed themselves highly pleased with the mine, and with the admirable way the agents were conducting the operations. About 80 tons of improved quality copper ore will be sampled on July 16. The meeting terminated with the usual vote of thanks to the Chairman.

## TRETHELLAN SILVER-LEAD MINING COMPANY.

The first general meeting of shareholders was held at the offices of the company, Gresham-street, on Tuesday,

Mr. T. A. MASEY, F.G.S., in the chair.

Mr. KENDRICK (secretary) read the notice convening the meeting.

The CHAIRMAN said this first meeting of the shareholders was held in compliance with the Act of Parliament, which obliges all limited companies to convene a meeting of its members within four months after incorporation. No doubt this provision was a very salutary one, as it enabled the directors to become acquainted with the shareholders, and also gave an opportunity of answering enquiries, and putting the members *en courant* with the plan of operation about to be carried out by the board. As his name did not appear in the prospectus, he might mention that he only joined the board after its publication; but before doing so he had paid a special visit to the property, and after verifying the truthfulness of the reports he accepted the post offered him. He might say that he had seldom seen a property—and he had inspected a good many—that possessed such fair prospects of early returns as the Trethellan Mine, for it was an exceptional circumstance to find so productive a lode as is there to be seen so near the surface; and, as it is an acknowledged mining law that lodes increase in productiveness as they acquire depth, there is every prospect of finding an abundance of mineral when it is followed down below the adit level. As the whole of the shares were not subscribed to enable the board to carry out the extensive operations first contemplated, the directors have decided, subject to the approval of the shareholders, to confine the first issue of share capital to the sum of 10,000*l.* He had also to inform them that the vendors had met the directors most liberally by relinquishing the cash payment for paid-up shares, although a large sum had been spent on the property. They had also agreed only to receive at present half the amount of the purchase money, and the remainder to be paid *pro rata* whenever the remaining share capital of the company is issued. This arrangement was so liberal, and identified the interest of the vendors so completely with that of the shareholders, that he thought all would agree with him it was an agreement that should be unanimously adopted (hear, hear), because it not only shows a hearty good feeling, but likewise a great amount of confidence in the future success of the mine. All the money now subscribed will be spent on the property. The directors propose at present to devote their operations to the development of one lode only. That is, a shaft will be sunk 20 or 30 fathoms on the course of the east and west lode and levels driven right and left of the shaft at that depth, where ore in paying quantities is expected to be met with. He might mention that before joining the board he went into a calculation of expenses and probable returns, and there was no reason why an outlay of 3000*l.* or 5000*l.* should not place the mine in a dividend-paying state, and if the capital to be issued be limited to 10,000*l.*, including the purchase, a small profit of 2000*l.* a year would pay 20 per cent., now 2000*l.* was not a very large sum to earn from so promising a property. In gathering particulars about the capabilities of the mine and what amount of ore would pay. He found that the celebrated Old East Wheal Rose Lead Mine, that paid over 300,000*l.* in dividends, and was situated within rifle-shot of Trethellan, only raised on an average ½ ton of lead to the fathom. Now, there was nearly, if not quite, as much ore as that showing for 30 fathoms in length in the adit level, so that if the ore in sight only slightly increases in quantity in depth there is a very bright future in store for the company. He did not think he could say anything more beyond stating that the directors would exercise the greatest economy, and only call up the capital in easy instalments as required.

The resolution approving the agreement as altered with the vendors having been seconded by Mr. W. C. Friend, it was adopted unanimously. It was decided that the first issue of shares should not exceed 10,000*l.*, and after some further discussion the meeting terminated with a vote of thanks to the Chairman.

## WHEAL UNY MINING COMPANY.

A general meeting of shareholders was held at the offices, Austinfriars, on Monday,—Mr. EDWARD KING in the chair.

Mr. JAS. HICKEY (the Secretary) read the notice convening the meeting, and the minutes of the last meeting (excepting the resolution as to East Uny) were confirmed. A statement of accounts, made up to the end of April, showed a debit balance of 106*l.* 6s. 7d.

The report of the agents was read, as follows:—

*June* 29.—During the past quarter great exertions have been made to drain the lower level in the mine as rapidly as possible; but this has been attended with great difficulty, chiefly on account of the weak state and crooked condition of the shaft under the 80 fm. level. We think, however, we have got over the most dangerous and difficult part of this work: and have just regained the 100 fm. level, east of Goodinge's shaft, and have put the pitwork down about 4 fms. under that level. We hope in a week or two to reach the 110 fm. level. King's skip-shaft is made complete 12 fms. under the 30 fm. level. The lode in the 30, east of King's shaft, has been cut into some 12 ft., which yields a little tin. We are now driving by the side of the lode in easy ground, with the view to get under the tin ground seen in the bottom of adit further east at Fox's. A winze in bottom of the 30 is down 7 fms.; this will prove the lode and ventilate the stopes in the back of the 45 fm. level; we hope to hole this wize in two or three weeks. We have been cross-cutting the lode in the 45 fm. level end east, and are into it 15 ft.; it appears as if this is in a poor piece of ground. We shall now urge on the end to get through the poor bar. Three stopes in the back of the 45 are worth 32*l.* per fathom in the aggregate. The ground is getting easier for driving. In the 60 east the lode is worth 16*l.* per fathom. A stope in the back of this level is worth 10*l.* per fathom. The 80 fathom level end east is worth 10*l.* per fathom. Four stopes in the back of the 80 are worth 10*l.*, 12*l.*, 15*l.*, and 18*l.* per fathom, respectively. A winze in the bottom of the 80, down 10 fms., is worth 15*l.* per fathom; this winze is intended for a portion of King's skip-shaft, and will ventilate the 100 fm. level as well (there being no 90 fm. level, east of Goodinge's, to any great extent). As soon as the winze referred to is holed we shall start off a 90 fm. level from it, and open out a good piece of tin ground gone down in the bottom of the 80 fm. level. The 100 fm. level end, east of Goodinge's, is worth 20*l.* per fathom. A rise in the back of this level, towards the winze already mentioned, is worth 20*l.* per fathom. If the ground continues favourable we hope to make a communication between the 100 and 80 fm. levels in about a fortnight. At Hind's engine-shaft we have fixed new and substantial bearers, and large cistern for two 16-in. plunger-poles, put in a good strong set of catches, and partly cut ground for underground balance-bob. The men are now employed cutting down shaft below the 80, and making room for third plunger-pole at that level. We have purchased several 16-in. pumps (second-hand), besides windbores, doorpieces, and H-pieces, but have not got enough pitwork yet. The capstan and shears are delivered on the mine, and we are building bob-stand, but are greatly in want of masons. The main-rods are bought, but not yet delivered. We have 10 men employed in this shaft, and four carpenters at surface, principally engaged in this new work. If we can get men sufficient to force on the work we hope to set Hind's engine to pump from the 80 in about three months' time. We have a great deal of new and expensive work in hand, such as draining the water left in by the late floods under the 80, making a new hauling-shaft, and double skip-road at King's, and the new pitwork at Hind's; and during the past quarter we have had only the shallow levels to work in, and our best tin ground under water. Besides this, the price of materials is extremely high, especially coal and iron. The most expensive items, taking quality into consideration, have nearly doubled in price. We hope, however, now we have drained the 100 to speedily drain the mine

deeper, when we shall be able to increase the returns of tin considerably.—WM. RICH, MATHEW ROGERS, SAMUEL COADE, Jun.

The CHAIRMAN said the calamity which occurred to the mine in the winter had produced the result shown in the accounts just submitted. Their operations had been confined to two levels—the 60 and 80, still they had been able to return 42 tons of tin, against 70 tons during the preceding quarter. The loss had amounted to 1500*l.* The 100 fm. level, however, was now dry, and in about a fortnight the 110 would also be available, but shareholders must look forward to an expenditure of something like 3000*l.* before they could expect the resumption of dividends. It must be recollected that iron is double the price it was, and that the value of labour had advanced 50 per cent., which took off somewhat of the increased value of their produce. The costs were charged up to the end of April, showing an indebtedness of 1060*l.*, and had the May cost been included there would have been added another 1600*l.* They possessed a splendid mine, and its prospects were never more brilliant than when the water came in. Each level from the 40 to the 160 was productive, nearly the whole of which had been jeopardised by the elements—everything, however, was being done to restore the mine to its profitable position, which would incur an expenditure of 3000*l.* and six months in point of time. They had now three times the engine-power hitherto possessed for working the mine, and when East Uny went to work Wheal Uny would be relieved. He then moved that the report be received, and with the accounts entered on the minutes.

Mr. BECKETT seconded the proposition, which was put and carried.

The CHAIRMAN proposed a call of 5s. per share, which would produce 1000*l.*, and stated that it would be necessary to charge up an extra month's cost at the next meeting.——A call of 5s. per share was made.

The resolution passed at the last meeting, by which the adventurers undertook to pay a part of the cost of the working of the East Uny engine, was rescinded.

A vote of thanks to the Chairman terminated the proceedings.

## RHYDTALOG SILVER MINING COMPANY.

A general meeting of shareholders was held at No. 3, Great St. Helen's, on Wednesday,—Mr. J. W. WILLIAMSON in the chair.

Mr. F. HARPER (the Secretary) read the notice convening the meeting. The report of the agent was read, as follows:—

*Rhydtalog, June 26.*—Since the last general meeting we have extended the 25 fm. level west on engine-lode 1 fathom. At this point we cut the middle lode, and opened on this lode 8 fathoms north, the lode is 3 feet wide, composed of clay-slate, spar, and mixed with lead ore, a very promising lode, although at, present of very little value: also extended a cross cut north 2½ fathoms, thinking at this point to meet with the engine lode. Extended west on middle lode 2 fathoms; at this point we discovered the engine lode, north of middle lode, and extended west of same 16 fathoms, lode for this distance averaging about 2 feet wide, composed of spar, blende, lead ore, and will produce about 10 cwt. of lead ore per fathom. At this point we intersected the new lode; at the junction the ground was very unsettled, but as we extended east and west it became more strong and the lode improved. Opened on the new lode 8 fathoms, lode 3½ feet wide, and will produce on an average 12 cwt. of lead ore per fathom, and letting down much more water, which I consider a good sign of improvement.—New lode: The 15 fathom level has been extended west 68 fathoms. The lode for this distance has varied from 2 to 4 feet wide, mixed with lead ore, but of little value for most of this distance; the last ten fathoms improved to a value of 8 cwt. of lead ore per fathom, with every indication of improvement as we advance west. The 15 fathom level east, on same lode, has been extended 17 fms.; lode for this distance from 3 to 4 feet wide; a fine looking lode, and will produce for this distance 10 cwt. of lead ore per fathom on an average. The new shaft has been completed to the level, 4 fathoms 3 feet, and a good substantial skip-road put down the same. Also a good skip-road put into the engine-shaft from surface to the 25 fathom level, which answers our requirements exceedingly well. Lead ground opened since last general meeting: In the 25 fathom level on engine lode, 14 fathoms long, average 10 cwt. per fathom; in the 25 fathom level on new lode, 8 fathoms long, average 12 cwt. per fathom; in the 15 fathom level east on new lode, 17 fathoms long, average 10 cwt. per fathom; in the 15 fathom level, west on new lode, 10 fathoms long, average 8 cwt. per fathom. We have now about 40 tons of bead ore prepared for dressing without any stoping. Our delay in getting a parcel of lead for sale, is in consequence of not being able to get lodgings for dressers. I am glad to say that we have now overcome that difficulty by having erected two good cottages, each to receive from eight to ten lodgers. We have also built a powder-house, and almost completed the agents' house, also got the dressing floors ready, so have now commenced to get a parcel of lead for market. In our future working I would recommend that the 25 fm. level should be driven east and west; lode east worth 15 cwts. of lead per fathom, west 10 cwts. per fm. I have every reason to expect an improvement in each. Also a winze to be sunk from the 15 to the 25 fm. level on new lode for ventilation and advantage of stoping. In sinking this winze we should be raising lead, and after this was completed to extend the 15 fm. level east and west on new lode, east being worth 10 cwts. of lead per fathom, and west 8 cwts. per fathom, with every prospect of improvement. In conclusion, I must say that I have every confidence in the future of this mine.—JAS. DUNKIN.

The CHAIRMAN explained the position of the capital account, stating that there were 12,000 shares of 1*l.* each, of which 6000 were given to the former owners of the property in lieu of purchase-money, and 2000 were subscribed for, providing a capital deemed to be sufficient to place the mine in a dividend-paying condition. As the former owners, besides accepting paid-up shares for the mine, had subscibed towards the 2000*l.* of working capital, they had at least shown their confidence in the value of the property. When this 2000*l.* had been expended another 2000 shares were issued, leaving 2000 yet to be dealt with; but whether it would be prudent to issue them, and then increase the number upon which the dividends would have to be paid, remained to be decided. Of the 4000*l.* subscribed, 3982*l.* had been expended on the working of the mine, and the balance had been absorbed by current expenditure. As to the mine, the report just read was so exhaustive that any remarks from him were unnecessary. They might, however, point out that the two levels—the 15 and 20—both east and west, were in ore, and they would have been in more ample funds had they been able to dress the ore. Being unable to obtain hands to dress the ore, they had erected two cottages capable of accommodating 20 to 24 hands, and a report had just been received from the manager that dressing was now going on. A special report had informed them that the value of the ore now in sight was about 4000*l.*, and an assay of its silver contents produced from 15 to 98 ozs. per ton. The old workers, some 20 years since, realised 30*l.* per ton; and calculating the average value was about 20*l.*, they would have no cause to complain of the result. The 15 fm. level had been driven through a good lode, the whole of which was standing, and a very valuable lode had been found at the surface, and the 25, which had been driven to cut it, reached it about a month since; when first cut it was in disordered ground, but it had since improved, and was now worth 15 cwts. of lead per fathom. As the instructions to the agent were rather to under than over estimate the value of the points of operation, there was reason to believe the lode was of greater value than stated. It continued to improve, and as the drivage was extended into the mountain and backs gained, a still greater improvement would no doubt take place. All practical miners who had inspected the property agree that it contained all the elements necessary for a first-rate mine. Here he might remark that what applied to Rhydtalog had equal reference to East Rhydtalog, though two mines being separated only by a river, so the probability was that what was found in one would likewise be found in the other. Should it be determined to issue the remainder of the shares—to which he was personally opposed if it could possibly be avoided—the shareholders would of course have the first offer, and whatever number might be issued there would be no difficulty in getting them taken up. The hindrance in the realisation of their anticipations arose entirely from the delay in the dressing of the ore, and he supposed six weeks would elapse before they were able to make a sale. As East Rhydtalog was deriving a benefit from Rhydtalog, both in point of labour and house accommodation, it seemed but right they should contribute a portion of the cost; the captain was of opinion they should pay 5*l.* per month. If the 40 tons of ore should realise anything like 20*l.* per ton, there would be ample funds, at least they should hope so. He then moved the adoption of the report and accounts.

Mr. C. MORRIS seconded the proposition.

The CHAIRMAN, in reply to a question, stated that the monthly returns would depend upon the number of hands employed.

Mr. C. THOMAS mentioned that after they had got over their present difficulty he anticipated they would be able, from the ground already laid open, to meet the current costs, and realise a profit, besides which there was the new lode, which they expected to prove of considerable value.

The CHAIRMAN, quoting from Capt. Reed's report, estimated the returns at 9 tons to 11 tons of lead per month, besides blende. Six months since the reserves were estimated at 4000*l.*, and since the 15 fathom level had been driven 49 fathoms, so that the reserves were much increased.

The report and balance sheet were received and adopted.

Mr. J. W. Williamson was re-elected director.

The CHAIRMAN, in acknowledgement, said, being largely interested in the company, his great desire was to push on the works as quickly as possible, as it was agreed on all hands that in Rhydtalog they possessed a great mine.

Mr. Darby was re-elected auditor.

A vote of thanks to the Chairman terminated the proceedings.

## EAST RHYDTALOG SILVER-LEAD MINING COMPANY.

A general meeting of shareholders was held at No. 3, Great St. Helen's, on Wednesday,—Mr. J. W. WILLIAMSON in the chair.

Mr. HARPER (the secretary) read the notice convening the meeting.

The account showed a credit balance of 1167*l.* 13s. 7d.

The report was read, as follows:—

*East Rhydtalog, June 25.*—Since the last general meeting we have extended the deep level on Rhydtalog engine-shaft 16 fms.; the lode for this distance is 2 feet wide, composed of spar, carbonate of lime, and producing good stones of lead ore. At this point we discovered a new lode, now known as the new south lode. This lode is parallel with the new lode, and is now taking back very fast; the lode is 3½ ft. wide, composed of soft spar, carbonate of lime, and producing good stones of lead and blende; we have opened on its course 8 fms. I consider this a very important discovery. The 15 east, on Rhydtalog engine lode, has been cleared, opened, and extended 12 fms. on the south part of the lode; this part of the lode is 2½ ft. wide, and produces good stones of lead ore, and for the last 3 fms. producing solid ribs of lead ore of small size. In about 10 or 12 fms. further driving I expect to cut the new south lode, which I think will be of much importance at this level. The deep level, on new lode, has been extended 45 fms.; this is now up to within 5 fms. of the shallow level. At this point I expect a good improvement, from the nature of the lode in the shallow level: lode large, and mixed with lead ore. The shallow level, on new lode, has been driven about 16 fms. since last general meeting: lode 5 ft. wide, composed of gossan, iron, blende, and spar. A more promising lode I never saw, which is my reason for expecting an improvement in the deep level as it comes up under this great gossan lode.—JAMES DUNKIN.

The report and accounts were adopted, the retiring directors and auditor were re-elected, and a vote of thanks to the Chairman and directors terminated the proceedings.

## NERBUDDA COAL AND IRON COMPANY.

The twelfth ordinary general meeting of shareholders was held at the London Tavern, on Thursday,

Mr. SAMUEL J. WILDE, in the chair.

Mr. FRED. R. BLUETT (the secretary) read the notice convening the meeting.

The report of the directors expressed great disappointment at the results obtained up to the present date. The board have been advised that a smouldering fire has been discovered in the No. 2 mine, which the agent has deemed it advisable to entirely close, with a view to stifling it. The delay in making the branch line has necessarily operated against the deliveries of coal. This, however, will now be obviated, as the line was in the early part of March opened to within ¼ mile of the collieries, and the remaining portion was expected to be completed by the end of April. The quantity of coal raised during the year 1871 amounted to about 6000 tons. The directors learnt with great surprise from the agent a few months since that, in his opinion, erroneous estimates had been made as to the quantity of coal that could be raised from the present workings. With such a statement before them, they felt that active measures should be adopted to open out new workings, and to prove whether in the face of all former reports from independent sources the foregoing opinion could be true, and upon mature consideration decided to replace the existing agent (Mr. Adley) by the best scientific and practical coal mining engineer they could procure; and, after careful enquiry, appointed Mr. Charles Maynard, of Darlington, as manager, whom they have every reason to believe possesses the several qualifications requisite for that important post. Mr. Maynard embarked for India on May 23. On his arrival he will assume the management, and will report upon the property to the board at the earliest possible date. The directors hope that now the one remaining obstacle to delivering the coal—the construction of the branch line—is obviated, the company will be enabled to keep their customers supplied, as Mr. Adley himself reports under his revised estimate, that the quantity of coal opened out is at least 153,000 tons, which has only to be brought to the surface to be available for sale; meanwhile, Mr. Maynard will have ample time to prove the coal on other parts of the company's property. The patent process for utilising coal slack, referred to in the last annual report, having proved successful, the board now propose sending out larger machinery for carrying on the manufacture on a more extended scale.

The CHAIRMAN said that when he last had the honour of addressing the shareholders he thought that the company would have been by this time in a very different position, and that there would have been a good excess of receipts over profits, even if they had not the satisfaction of declaring a dividend. Two causes had operated against that result being realised during the present year—the delay in the completion of the branch line up to the mines, which there was every reason to believe was now fully completed; and, secondly, which was the more important matter of the two, they had been led to believe that directly the line was completed the mines were in a position to yield large quantities of coal, but, according to Mr. Adley, they were not able to raise that large quantity, and that some little time must elapse before they would be able to do so. He then read extracts from the different reports which had been made upon the property since 1861. Mr. Blackwell, who was employed by the Government of India to seek for coal in different provinces, gave up his appointment, and became the manager of the company's mines, and remained in that capacity for years—indeed, the company was formed upon the official report made by Mr. Blackwell to the Government of India. In 1863 Mr. Blackwell wrote that he never before had such a high opinion of this property—the coal (Mr. Blackwell added) is opened to a considerable extent, and its value as a fuel is shown. In 1865 Mr. Heath, their late managing director, went out to India, and stated that all who visited the collieries expressed but one opinion—the coal was good and abundant, and at that time (1865) they could raise 200 tons per week; and there was no doubt the company possessed a valuable property; and Mr. Simpson, in 1866, gave a very favourable opinion of the property. In 1869 they were again disappointed by the opening of the railway being put off for another two years; and at that time the board sent out instructions to suspend all works of every kind, so as to expend as little of the company's money as possible. Of course, a certain expense was necessary, in order to keep the collieries open and safe. Had the Great India Peninsula Railway Company given the encouragement to which the Nerbudda directors considered they were entitled matters would now, no doubt, have been very different. In 1869 Mr. Mark Fryer visited the district in his official capacity, and reported favourably upon the company's property; and in 1871 a Government official informed him (the Chairman) that he had no doubt about the quantity of coal, and that a great deal could be worked by the present levels; and the only fault was that the collieries had not been sufficiently opened. The directors had published Mr. Adley's report *in extenso*, which was very contradictory to everything that had gone before. Mr. Adley now states that he could not raise anything like the quantity of coal that there were customers for, and that there were "faults," of which he was not aware—a statement totally opposed to the views of authorities who had previously visited the collieries. The board had great doubts whether Mr. Adley was not wrong; but when Mr. Adley said that he could not raise the quantity the board felt it duty incumbent on them to find someone who could do so. They had accordingly sent out Mr. Maynard, an experienced and practical man, but his report could not be received in less than two months from the present time. Directly it was received it would be published, and forwarded to the shareholders. Mr. Medlicott's report in 1870 stated that the company might count upon a very large supply of coal for many years to come. It might be recollected that the Great Indian Peninsula Railway sent out Mr. Sopwith to give a report upon the coal field, but they were not able to obtain this report until quite recently. Mr. Sopwith was sent out almost in opposition to the Nerbudda Company, but Mr. Sopwith says that the actual amount of coal proved was 120,000 tons, and that it by no means follows a much larger quantity does not exist. It is (adds Mr. Sopwith) an unsatisfactory fact that more pains had not been taken to ascertain the real value of the property, for there was no doubt the company possesses a valuable concern. Had the Nerbudda board known this fact sooner borings would have been commenced earlier. He need hardly say it was a great surprise to them to find Mr. Adley's report giving such a totally different statement to everything previously communicated to the board; and one of his colleagues, Mr. Lloyd Foster, who has been a coal miner from his youth, thinks the fault is in Mr. Adley, and not in the collieries. There was no question whatever they had a most valuable property, but that it required to be developed a little faster than had hitherto been the case. As to the application to the Government to be relieved from the necessity of making iron, legal documents had been sent over from the Government of Calcutta relieving the company from that liability, but the Government required that if at any future time another company should come forward and offer the same terms they (the Government) should have the power to determine the contract with the Nerbudda Company altogether, and take the coal into their own hands. The terms, however, were perfectly ridiculous, wanting to rescind the contract by giving the company about 5000*l.* or 6000*l.*—that is, in the improbable event of another company being found to make iron. Objections to such a contract went out six months since, but nothing further had yet been heard of it. When it was arranged the directors would be in a position to call a meeting to reduce the capital. A call of 1s. per share had been made, which he hoped would carry them through, as not more than 5d. per share had yet been expended. He moved the adoption of the report and accounts.

Mr. LLOYD FOSTER seconded the proposition.

Mr. J. S. NEALE suggested the advisability of reducing the expenses.

Mr. LLOYD FOSTER said that faults may throw the coal up or down, but that the coal was there he was as certain as he was in that room at the present time. Fresh borings would now be made, and no doubt new collieries would be opened.

The CHAIRMAN, in reply to a question, said that Mr. Adley received 1000*l.* per annum; Mr. Maynard would receive 800*l.*, to be increased when the collieries were brought into profitable operation. Mr. Adley's services had been determined by giving him six months' notice. By the present arrangements a saving of 300*l.* had been made in the London expenses. During the last 10 years all the remaining shares had been issued to gentlemen in India, who being on the spot would not have taken the shares unless they were satisfied of the value of the property.

After some further discussion, the report and balance-sheet was received and adopted. Messrs. Martineau and Cutler were re-elected directors, and Mr. Waddle auditor. A vote of thanks to the Chairman and directors terminated the proceedings.

ROMAN GRAVELS.—At a board meeting, on Wednesday, the directors declared a dividend of 300*l.* (5s. per share), payable July 12.

NEW WHEAL LOVELL.—At the meeting of adventurers, on June 25, the accounts for four months ending March 23 showed a balance of profit of 34*l.* 6s., and a credit balance on the cost-book of 39*l.* 7s. 3d. Capt. J. Frisk says—"Taking into consideration the large profitable lode in the 50, which is the deepest level opened up in this part of the mine, and the prospects of the 60 opening out equally good, together with the addition of the north lode, I consider, on the whole, the prospects to be better than at the last meeting. The increased price of labour and coal during the last four months, and the extra consumption of the latter, incident to the winter season, have augmented the cost for the period at least 150*l.* In addition to the tin sold in the last four months we have several tons of copper ore ready for sale, which will be sold shortly. We have also contracted for the sale of certain spare materials, which will be credited in the next account. The number of hands employed are 116. Tut workmen, 46; tributemen, 16; timber and pit-work, two men; carpenters and sawyers, three: smiths, one man and one boy; engine men, three; landers and fillers, four; spallers, four; general surface workmen, three; and at the stumps, one man, 15 boys, and 17 girls."

SOUTH WHEAL FRANCES.—At the meeting, on Monday, the labour cost for two months was 1574*l.*; merchants' bills, 762*l.*; dues, 66*l.*; total cost, 2423*l.* Credits, 1901*l.* Loss on two months' working, 521*l.* Debit balance carried forward, 382*l.* No call was made. The report was considered a very poor one, and there was a great falling off in the returns of tin. Mr. J. F. Penrose was added to the committee. Capt. John Opie was appointed third agent. Mr. John Thomas attacked the committee in a long speech for their conduct at the last meeting, and also Mr. Broad (the Chairman) for sending out such a circular. Capt. Pascoe replied, in a heated speech, to some remarks Mr. John Thomas had made, and tendered his resignation by letter. Mr. John Thomas moved that it be accepted, with thanks for his past services, which was carried. Mr. Broad also said that he would resign. Mr. John Thomas proposed Capt. A. James as manager; and Mr. J. F. Penrose as purser, subject to confirmation of a special meeting to be called. The Chairman declined to put the motion, but it was put by Mr. John Thomas, and carried. The meeting was a long and stormy one.

[For remainder of Meetings see to-day's Journal.]

RICHMOND CONSOLIDATED MINING COMPANY.—We are pleased to learn that the difficulties between the Richmond Consolidated Mining Company, of London, and the adverse claimants to property claimed by it at Eureka, Nevada, have been settled without the expense of troublesome litigation, thanks to the ability and foresight of Mr. J. J. Corrigan, one of the London managers of the Richmond Company, who came out delegated with full power to act in the premises—the gentleman himself for several years a resident of London, but an old Californian—one familiar with the ways of our people and the rules and customs of mining communities, readily saw upon an investigation the true position of his company's affairs, and compromised matters, thus saving a large outlay of money in expensive litigation and the more than probable loss of its mine in the end, the latter having been held under a title weak in its origin, but now made secure and invulnerable by the purchase of all conflicting claims. The price paid was $75,000. We wish the Richmond Company all success, but having alluded to these difficulties once before in the shape of an advertisement, which we have since learnt conveyed a one-sided, incorrect view of the case, we would suggest, for the future guidance of our "English Cousins," that they be a little more careful in examining into titles to mining properties.—*San Francisco News Letter*, June 8.

## FOREIGN MINES.

UTAH.—Telegram from the superintendent, J. R. Murphy, July 3: Calcination and smelting completely successful; mining constantly making good profits; everything most promising; reports forwarded.

FRONTINO AND BOLIVIA.—The directors have received advices under date May 12, from Messrs. Restrepo and Sons, the company's bankers at Medellin, accompanied by a remittance of gold dust, valued at 1690*l.* 16s. 8d., the produce from the mines for the month ending April 20. It is with great satisfaction that the directors draw the shareholders' attention to the accounts for the month of April. It is believed that henceforth under the able management of the company's bankers at Medellin the monthly returns will increase as the new lodes from time to time are worked upon, and the works become more developed. The following are the amounts for the month ending April 26:—Produce, 663½ ozs. of gold dust from 2150 tons of mineral (average yield per ton 6 dwts. 4 grs.), 1690*l.* 16s. 8d.; cost, at Frontino and Bolivia Mines and expenses in London and Medellin, 1174*l.* 1s. 10d.; showing a profit of 516*l.* 14s. 10d.

EXCHEQUER (Gold and Silver).—June 6: The main tunnel was in 721 ft. on the 1st inst., 10 ft. being made during the week, and two sets of timbers put in. The men were half-a-day occupied in shifting the air-pipes further into the face of the tunnel. The ledge is now 6 ft. wide, and the character of the rock has greatly improved, though hard to work, blasting being still difficult.

— June 10: On Saturday last the main tunnel was in 734 ft., 13 ft. having been made during the week, and three sets of timber put in. Some very promising looking quartz was met with on Thursday in the centre of the face, widening out downwards to about 2 feet.

MONTE ALBO.—June 18: Su Ergriolu: The lode in No. 6 level, driving south from new shaft, will yield ¼ ton of ore per metre, and in the same level north it yields good stones of ore. In the No. 5 level, south from new shaft, the lode yields ¼ ton of ore per metre; here, for the last 7 metres, we have a good lode of ore, yielding for size of level ¾ ton of ore per metre. The lode in No. 4 level south is 1 metre wide, composed of quartz and blue killas, intermixed with spots of lead ore. The winze under the No. 3 level south, in the bottom of Santa Barbara, is producing good stones of ore. This winze was sunk by the former owners of the mine, and on examining each end of the winze we can see good spots of lead ore for the whole depth, and we are now sinking it to communicate with the No. 4 level below.—Stopes: No. 1, above the No. 5 level, south of new shaft, will yield ¾ ton of ore per metre, and north of this shaft ½ ton per metre.—Guzurra: Julius Cæsar cross-cut is hard to drive; present price, 45 frs. per metre. The stope in the back of Julius Cæsar level, on lode D, is at present poor. In Napoleon level, driving east on the course of the lode; the lode is 1 metre wide, composed of quartz, blende, and white iron, intermixed with stones of schist. Stope No. 1, in back of Galleria Nuevo, for 5 metres long, will yield ½ ton of ore per metre. No. 2, in the back of this level, will yield ¾ ton per metre.

RICHMOND CONSOLIDATED.—Extract from letter, dated June 10, from the manager of the mines to the Secretary, received in London July 2:—"The furnace has been up to this time running splendidly. If the ore continues of the same grade as during the past two weeks, indeed ever since we started up the furnace, and should everything continue to work as well as at present, I doubt not that our gross monthly product with one furnace will run up to $90,000.—R. A. FISHER."

— Copy Cable received by the Secretary from the manager of the mines, dated July 3:—Last week's product 222,000.—FISHER."

BATTLE MOUNTAIN.—Capt. Richards, June 13: Virgin: In this mine no change has taken place since the report of last week, except in the 113 drift north, which has improved in appearance. At Lake Superior, during the past week the 135 ft. level has been secured with timber, and work will be resumed in this level south very shortly: 2049 sacks shipped per Evelyn, 1438 sacks waiting shipment, and 310 sacks raised during the week.

ALMADA AND TIRITO.—The 17 tons of unconcentrated black ores, per Fleetwing, have been sold by Messrs. James Lewis and Son, of Liverpool, at 34*l.* 15s. 6d., the ores containing about 120 ozs. of silver, and 11 per cent. of copper, per ton of 2240 lbs.

The directors have received a bill of lading for 53 American tons of concentrated black ores, shipped at Guaymas for Europe. These ores are worth for silver and copper over 50*l.* per ton English.

BENSBERG (Lead Mining and Smelting).—J. W. Hoffmann, July 1: During the month of June nothing was done at the shaft, the pump not being complete until the end of the month. The trench in the open-cast was pushed on, and yielded very good ore at a small cost. The carbonate particularly was very rich, assaying about 68 per cent. of lead; the ground was loose and washy, so that the sides of the trench required timbering for 10 fathoms. On both sides we left carbonate of the same quality standing 2 and 3 feet thick above the sole of the trench. After having gone about 10 fathoms the carbonate dipped, and we went through 2 fathoms of barren stuff, beyond which again we met galena, in which we are still working. We have been busily engaged moving the banks round the open-cast with the view of extending the latter, as we know the ore to extend beyond the present limits of the open-cast; hereby we also found some carbonate. The ore which we sample this month is mostly from the trench, and has been got out by three men, at a cost of 70 thalers. About one-half of it required washing and dressing, the rest being ready for market as it was dug out. The weight is 40 tons, and it is worth 1700 thalers. The boilers, engine, and pumps are now on the ground. We are now putting the pump together, and connecting it with the boiler, and shall have it at work in a short time. We got out and sold 100 tons of ironstone this month.

CAPE (Copper).—Railway traffic from April 6 to May 18, 456 tons up and 758 tons down. Good rains had fallen, and prospects of riding season were good. Bills of lading are received for 525 tons of ore per Croydon. The following ships had arrived at Port Nolloth and Hondeklip, with outward cargoes and to load ore:—William Jones, Lizzie, Tacna, Lynwood, and Glanrafon (to load together about 2350 tons). The Antonio Vinent and Ocean King, with 1175 tons of ore, had arrived at Swansea. The sale of ore, ex Juliet Daniel, reported in slip of June 11 last, has realised approximately 17,300*l.*: 495 tons of ore, and 40 tons of regulus were sold at last ticket, at 20s. 1½d. per unit, the approximate amounts realised being 16,250*l.* and 2200*l.* respectively.

WEST CANADA.—June 8: At Wellington Mine, the stope in the bottom of the 40, east of Rowe's shaft, the lode will yield 3 tons of ore per fathom.—Huron Copper Bay: In Bray's shaft, below the 60, the lode is still large and promising, and is worth 1½ ton of ore per fathom. The 50, west of Palmer's shaft, contains a little ore, but not enough to value. The stope in the back of the 60, east of Bray's shaft, yields 2½ tons per fathom; and the stope in bottom of the 50, west of Palmer's shaft, also yields 2½ tons. The stope under the 35, west of Palmer's, yields 3 tons per fathom; the men here will be putting in stull this month. In the bottom of the 35, east of Bray's shaft, the stope yields 2½ tons per fathom. Another stope in the bottom of this level, east of Bartle's winze, yields 3 tons per fathom; and one west of Bray's shaft, on Fire lode, is worth 2½ tons per fathom. The stope in the bottom of the 20, east of the new engine-shaft, yields 2½ tons per fathom.

LUSITANIAN.—June 25: Palhal: In Taylor's engine-shaft, sinking below the 150 fm. level, the lode is producing 3 tons of ore per fathom.—Levels on Basto's Lode: The lode in each end of the 150 fm. level is 4 ft. wide, composed of quartz, with stones of ore, and is of the same character in the 140 east, where it is 6 ft. wide. The 140 is being driven south-west on the slide lode, which is very small, but at times contains spots of copper ore and mundic. In the 130, east of Taylor's, the lode is 6 ft. wide, and in the 120 east 3½ ft. wide, composed entirely of quartz. The lode in the 110 east is 2½ ft. wide, composed of quartz, and spots of ore; and in the 90 east it is of the same size, worth nearly 1 ton of ore per fathom. In the 80, west of winze No. 89, east of River shaft, the lode is 2 ft. wide, spotted with copper ore. In the 80, east of ditto, the lode yields ½ ton of ore per fathom. The lode is 4 ft. wide in the 70, east of River shaft, containing quartz and country, spotted with lead. In the adit west of Perez' shaft the lode is small and unproductive. In the branch in the 38, west of slide, the lode is still very small and poor.—Slide Lode: In the 130, south-west of Taylor's, the lode is small, at times showing spots of ore. In the 130, north-east, the lode is 1 ft. wide, composed of dry flookan. The 18 fm. level cross-cut south has passed through a branch which is poor, and the end is now suspended.—Carvalhal: The 60 cross-cut, north of incline shaft, is in a hard gneiss. The ground in the 60 fm. level cross-cut south is not very hard, but wet; we have cut a branch, but it is of no value.—Levels on Great Lode: In the 60, east of incline shaft, the lode is 3 ft. wide, composed of quartz, spotted with lead. In the 50 east the lode is 1 ft. wide, unproductive. In the 50 west the lode is 1½ ft. wide, composed of quartz. The 40 east contains stones of lead, and the 40 west yields ½ ton of lead per fathom. The 30 east is composed of quartz. The lode in the 20 east is 1 ft. wide, composed of quartz, and a little mundic. In the adit level west of incline shaft, on flookan lode, the lode is 1 ft. wide, unproductive, but has more water in it.—Levels on Canster Lode: The 10 fm. level, south-west of incline shaft, contains a lode 3 in. wide—quartz. The 20 west is worth ¾ ton of lead ore per fathom, and the 30 west ½ ton per fathom.

[For remainder of Foreign Mines see to-day's Journal.]

THE SOMERSET COAL FIELD.—A resolution agreed to at a recent meeting of Somerset colliery proprietors, which raises the coal at the whole of the pits 1s. 8d. per ton, has come into operation. This rise is the result of an agitation on the part of the colliers employed in the field for increased wages, diminished hours of labour, and an alteration of the system under which they work in such a manner as to be less prejudicial to their interests. The men have recently formed a local branch in connection with the amalgamated society of miners, and almost 2000 men have joined the society. The colliers have held several mass meetings, at which they evinced a strong determination to enforce claims which they believe to be honourable, just, and fair; but at the same time expressed the greatest respect for their employers and a lively appreciation of their interests, and even went so far as to say that they would not enforce their claims while contracts that had been entered into were unfinished. The proprietors recently granted an advance of 50 per cent., and some of them now are strongly opposed to granting further concessions, and have even made preparations for a strike; but the demand for coal is far greater than the supply, and the men have several potent arguments that will favour their cause. The most prominent of these is that the seams of coal in the Somerset field are so exceedingly thin that only those colliers who have been trained in the district can hew the coal. The most prolific seam is only 2 feet thick, and there are five other seams which vary much in thickness and quality. One of the best seams is only 1 foot thick, and is met with a third of a mile from the surface. Both parties however, have assumed a resolute attitude, and the men are only waiting till they have obtained the maximum of members in their Union to commence a demand for more liberal remuneration. The inhabitants of the neighbourhood, who will be the greatest sufferers in the event of a collision, and who will have to pay for any concessions granted to colliers, wish to see an amicable settlement.

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THE BEST AND ONLY PRACTICAL DRILL.

IT DOES NOT GET OUT OF ORDER.

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PROGRESSES through Aberdeen granite at the incredible rate of 10″ per minute.

SAVES £5 a day as compared with hand labour, independent of the enormous saving effected in the general expenses, such as PUMPING, VENTILATION, INTEREST OF CAPITAL, &c., from the fact of the "put-out" being increased four-fold.

DRILL POINTS.—The saving in steel alone is considerable. One drill will go through 20 feet of Aberdeen granite without sharpening.

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For the REMOVAL and PREVENTION of INCRUSTATIONS in STEAM BOILERS, is in extensive use among Collieries, Ironworks, and Mills in Scotland; also, with great success, on the North British Railway Company's Locomotives.

Net price, 15s. per cwt., carriage paid; 10 per cent. off 1 ton orders; free from acids.

A TRIAL SOLICITED.

SPECIALLY RECOMMENDED for LOCOMOTIVES, being completely soluble in water, and only requires to be put into the tender.

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ESTABLISHED 1848.

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PROTECTED BY ROYAL LETTERS PATENT.

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(FROM COAL DUST),

SUITABLE FOR ALL PURPOSES FOR WHICH COAL IS USED.

This fuel, made from dust coal, gives in use results superior to the best coal; it is thoroughly water proof, stacks without liability to spontaneous combustion, loss, or deterioration on board ship, or in any climate, and in 30 per cent. less space than coal.

An immense saving in effected by its use on sea-going steamers, owing to its high evaporative power, requiring one-third less stowage room, and avoiding all risk of spontaneous combustion. It burns with little smoke, forming itself into coke; it is very durable, the combustion is perfect, and it will not fall or disintegrate in great heat before a blast or strong draught, nor does it produce clinker.

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As regards the manufacture, it is easily and cheaply made; the machinery made is simple, effective, and comparatively inexpensive.

No heavy pressure is required, or exposure to heat after moulding, to dry or coke (as is usual); and after mixing, the blocks could, if desired, be made up by hand labour; but for large production, self-acting machinery is recommended; and when moulded, the fuel is at once ready for use or transit.

Works are in operation in London, and can be viewed on application.

Intending licensees can send their coal and have it made up into fuel in their own presence, and have it returned to them for trial.

Samples on a large scale suitable for every purpose supplied for trial.

The proprietors of the patents are prepared to grant licenses, and would, if desired, undertake contracts to provide machinery, erect works, and put the same into satisfactory operation, on any required scale of manufacture.

Application to be addressed to the patentees—

Mr. DAVID BARKER, Oldbury House, Northfleet, London; or Mr. THOS. D. CLARE, 13, St. Mary's Row, Birmingham.

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By CHARLES BARLOW, Esq.

"Well worthy of perusal."—*Mining Journal*, 20th April, 1872.

London: E. MARLBOROUGH and Co., 4, Ave Maria-lane.

# THE HOWARD SAFETY BOILER,

For STATIONARY and MARINE ENGINES, has the following advantages:—

SAFETY; NO RISK from DANGEROUS EXPLOSION; HIGH-PRESSURE STEAM, with ECONOMY OF FUEL; perfect circulation, and ready means of removing sediment.

Saving of cost and time in repairs; portability, and, for export, great saving in freight.

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AWARDED TWENTY GOLD AND SILVER FIRST-CLASS PRIZE MEDALS.

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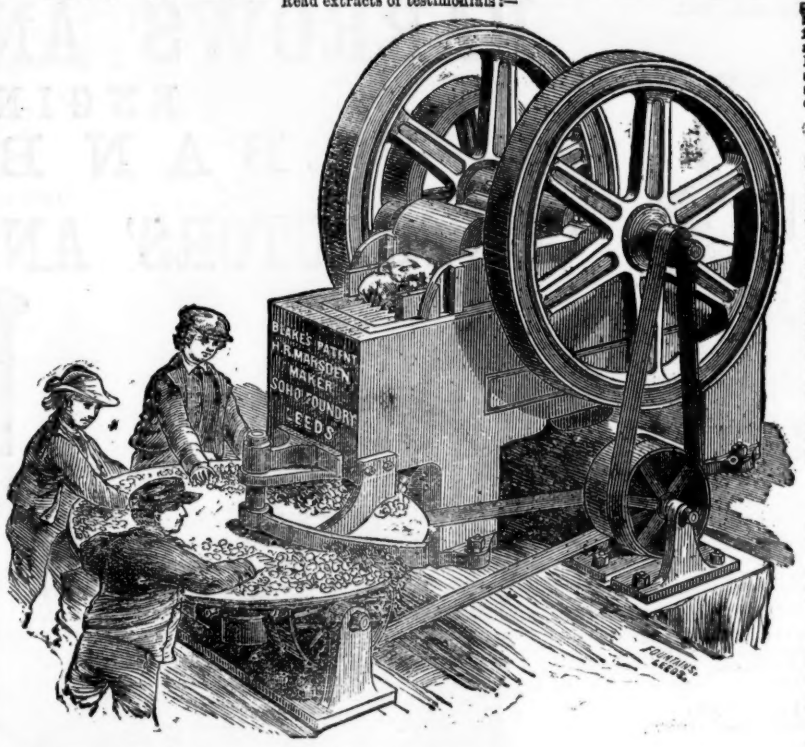
## OR ORE-CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.

This is the only machine that has proved a success. This machine was shown in full operation at the Royal Agricultural Society's Show at Manchester, and at the Highland Agricultural Society's Show at Edinburgh, where it broke 1½ ton of the hardest trap or whinstone in eight minutes, and was AWARDED TWO FIRST-CLASS SILVER MEDALS. It has also just received a SPECIAL GOLD MEDAL at Santiago, Chili.

It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England.

Read extracts of testimonials:—




*The Parys Mines Company, Parys Mines, near Bangor, June 6.*—We have had one of your stone breakers in use during the last 12 months, and Capt. Morcom reports most favourably as to its capabilities of crushing the materials to the required size, and its great economy in doing away with manual labour.

For the Parys Mining Company,
H. R. Marsden, Esq. JAMES WILLIAMS.

*The Van Mining Company (Limited), Van Mines, Llanidloes, Feb. 6, 1871.*—Our machine, a 10 by 7, is now breaking 180 tons of stone for the crusher every 24 hours. I may say, of all our machinery, that for simplicity of construction and dispatch in their work, they are equal to anything in the kingdom, but your stone breaker surpasses them all. W. WILLIAMS.
H. R. Marsden, Esq., Leeds.

*Chacewater, Cornwall, Jan. 27, 1869.*—I have great pleasure in stating that the patent stone breaker I bought of you some three years ago for mines in Chili, continues to do its work well, and gives great satisfaction. It crushes the hardest copper ore stone—put it through ½ inch size by horse power—with great ease. I can safely recommend it to all in want of a crusher; can be driven by steam, water, or horse power.
H. R. Marsden, Esq. JAMES PHILLIPS.

*Terras Tin Mining Co. (Limited), near Grampound Road, Cornwall, Jan. 1871.*—Blake's patent stone crusher, supplied by you to this company, is a fascination—the wonder and admiration of the neighbourhood. Its simplicity is also surprising. Persons visiting it when not at work have been heard to remark, "This can't be all of the machine." It will crush to a small size from 8 to 10 tons of very hard and tough elvan rock per hour; takingt nto its leviathan jaws pieces of the hardest rock, weighing 200 lbs. or more, masticating the same into small bits with as much apparent ease and pleasure as does a horse his mouthful of oats. On every 100 tons of the rock crushed by the machine there is a direct saving to the company of not less than £5 over the process of hand labour previously adopted by them, and the indirect saving much more, the machine being ever ready to perform the duties required of it. It breaks the stuff much smaller, and in form so fitted for the stamps, that they will pulverise one-third more in a given time than when performed by hand labour.
JOS. GILBERT MARTIEN.
H. R. Marsden, Esq., Leeds.

*Welsh Gold Mining Company, Dolgelly.*—The stone breaker does its work admirably, crushing the hardest stones and quarts. WM. DANIEL.

*Ovoca, Ireland.*—My crusher does its work most satisfactorily. It will break 10 tons of the hardest copper ore stone per hour.
WM. G. ROBERTS.

*General Frémont's Mines, California.*—The 15 by 7 in. machine effects a saving of the labour of about 30 men, or $75 per day. The high estimation in which we hold your invention is shown by the fact that Mr. Park has just ordered a third machine for this estate. SILAS WILLIAMS.

Your stone breaker gives us great satisfaction. We have broken 101 tons of Spanish pyrites with it in seven hours. EDWARD AARON,
H. R. Marsden, Esq. Weston, near Runcorn.

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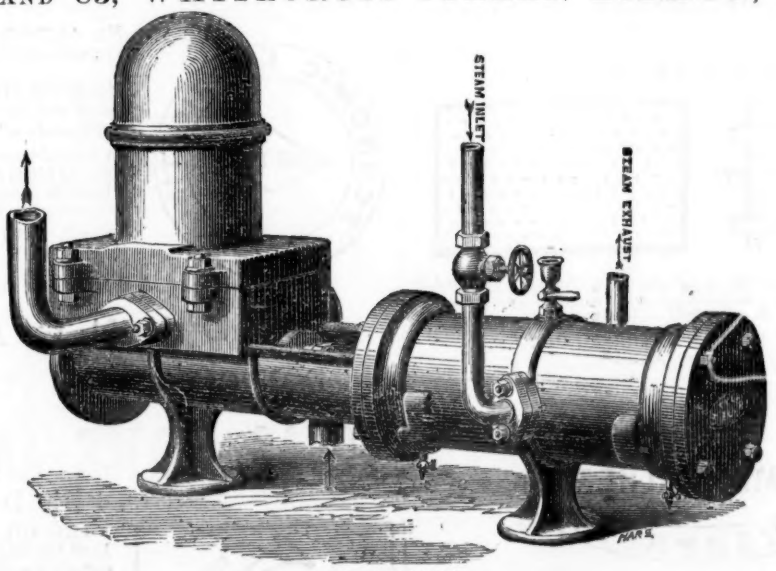


TESTIMONIALS.

*Tottenham Local Board of Health, Tottenham, 12th December, 1870.*

GENTLEMEN,—I have much pleasure in informing you that your Steam Pump proved itself to be one of the most useful machines for raising water that I have ever seen. It was driven night and day for nearly three months without a single hitch. The construction of the pump is so simple that any person can be taught to open it, and replace or clear the valves. I have seen no engine at all to be compared with it for mines, coal pits, or small water-works.

I am, Gentleman, faithfully yours, (Signed) P. P. MARSHALL, C.E., Surveyor.

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*Aston Main Coal Company, near Sheffield, 1st December, 1871.*

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GENTLEMEN,—In answer to your enquiry, I beg to state that the two "Universal" Pumps supplied to us (through your agent, Mr. T. A. Ashton) are doing our work exceedingly well; we think they are the best in the market, and shall be glad if you will send us another 9-in. cylinder 6-in. pump, one week from this date.

Yours truly, (Signed) ASTON MAIN COAL COMPANY.

Extract of a Letter from JOHN SIMPSON, Esq., to Hayward Tyler and Co.'s Agent.

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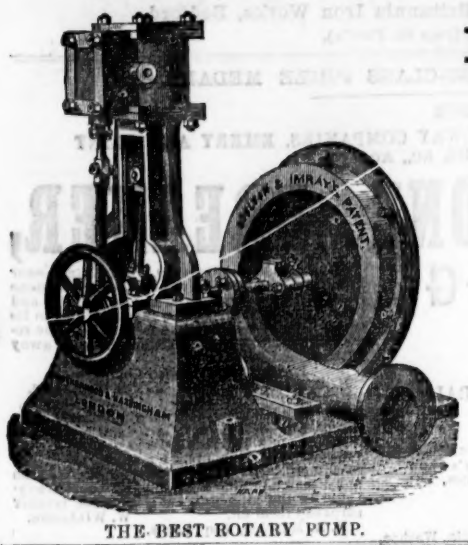

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IMPROVED GAS EXHAUSTERS.
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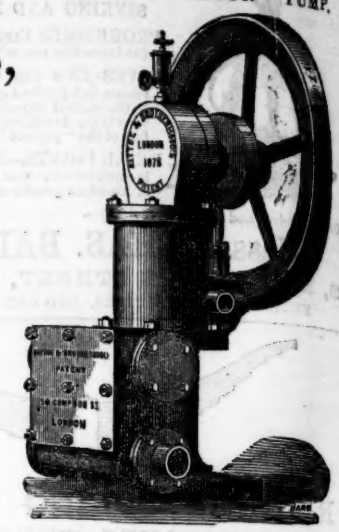

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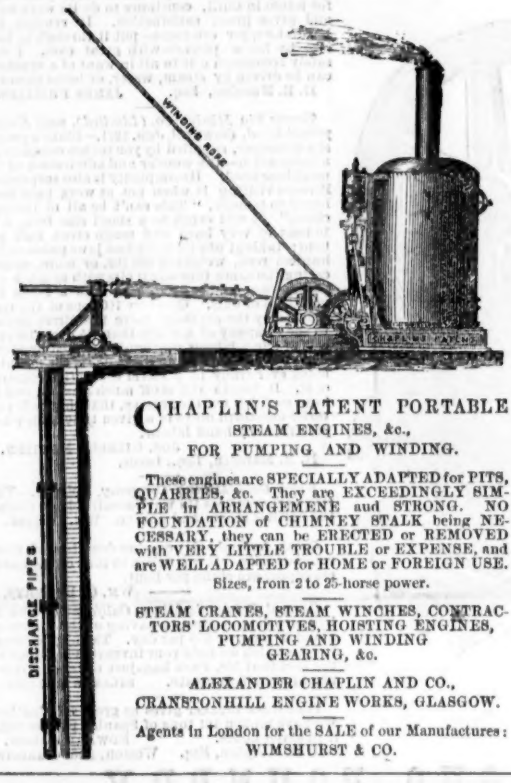
Prize Medal—International Exhibition, 1862.

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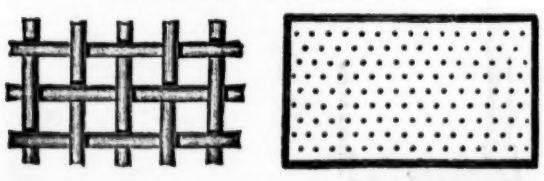

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MR. ALFRED HEWLETT, of the Wigan Coal and Iron Company, says:—"I have used it for two years, and find it to answer exceedingly well for lubricating purposes."

MR. NASMYTH, the Inventor of the Steam-Hammer, says:—"I am highly pleased with it as a most effective and durable lubricant, having remarkable properties in the way of setting free bearings which had got set fast."

In face of these and hundreds of other letters to the same effect, it is a MERE WASTE OF MONEY to use the dearer kinds for the engines and machinery of collieries and mines, numbers of which are now using the Don Oil instead.

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PRICE—By the Ton of 253 Gallons, 2s. 6d. a gallon; by the Cask of 40 Gallons, 2s. 9d.

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# CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,

AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.

THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

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"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

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"T. W. KEATES, F.C.S., &c. &c

Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

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WORKS: MILLWALL, POPLAR; and ERITH, KENT

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